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THE OPHTHALMIC RECORD.

G. C. SAVAGE, M. D., Editor and Publisher.

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THE

OPHTHALMIC RECORD.

VOL. II. JULY, 1892. No. 1.

INSUFFICIENCIES OF THE OBLIQUE MUSCLES AND HOW TO CORRECT THEM.*

BY G. C. SAVAGE, M.D.,

Professor of Ophthalmology and Otology, Medical Departments
University of Nashville and Vanderbilt University,
NASHVILLE, TENN.

In the Archives of Ophthalmology, Vol. XX, No. 1, 1891, I announced my discovery of "Insufficiency of the Oblique Muscles." I closed that paper by saying of the nervous symptoms brought about by this state "I can see no hope of prevention or cure." On the 17th. day of May, 1892, while a patient was before me whom I had known to be a sufferer from this condition

*Read before the Section of Ophthalmology of the A. M. A. at the Detroit Meeting, June, 1892.

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for two years, and to whom I had often said "There is not now, nor can I see how there ever can be, any relief for this trouble," a thought of the proper means of correction dawned upon me. I at once applied the newly thought-of principle in this case and with the most gratifying results. Of this case I shall have more to say before closing this paper.

Before setting forth the treatment I will refer to the condition itself, and the proper means of detecting it. In doing this, since I cannot do better, I quote from my paper published in the Archives: "Every ophthalmic surgeon, however skilled in correcting errors of refraction and in operating for the different known forms of heterophoria, has had cases of eye-strain for which he could do but little. In investigating a few such cases during the last six months I have found the cause to be a want of equilibrium on the part of the *oblique muscles*. The detection of this condition is easy. I place a double prism (my modification of the Maddox prism) before one eye, the other for the moment being covered, and ask the patient to look at a horizontal line on a card held eighteen inches away. The effect of the double prism (each 6°, bases in), so placed that the axis is vertical, is to make the line appear to be two, each parallel with the other. The other eye is now uncovered, and a third line is seen between the other two, with which it should be perfectly parallel.

"While a change of the position of the axis of the double prism from the vertical towards the horizontal will alter the distance between the lines, their direction will be unchanged, hence no loss of parallelism. This fact admits of a little carelessness in the placing of the prism in the trial-frames, though the axis should be vertical so as to give the maximum distance between the two extreme lines.

"If there is a want of harmony on the part of the oblique muscles this test will show it at once in a want of parallelism of the middle with the two other lines, the right end of the middle line pointing towards the bottom and the left end towards the top line, or *vice versa*, depending on the nature of the individual case.

Fig. 1.

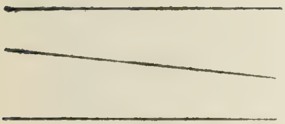


Fig. 3.

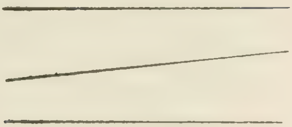


Fig. 2.

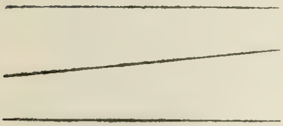


Fig. 4.

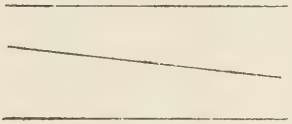
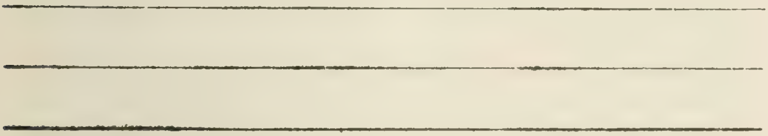


Fig. 5.



“In my investigations I have always considered the eye before which no prism is held as the one under test. With the double prism before the right eye the patient is asked about the position and the direction of the middle line. It may be nearer the bottom, thus showing left hyperphoria; or again, it may extend farther to the right than the other two and not so far to the left, thus showing exophoria, or vice versa, showing esophoria.

“If the right ends of the middle and bottom lines converge while the left ends diverge, the superior oblique of the left eye is at once shown to be in a state of underaction. Fig. 1 represents such a test of the left eye. Fig. 2 shows a test of the left eye when the inferior oblique is the too weak muscle. Fig. 3 represents a test of the right eye, the loss of the parallelism between the lines being due to underaction of its superior oblique, and Fig. 4 the same condition of the inferior oblique of the right eye. Fig. 5 represents a test of both eyes when there is perfect equilibrium of the oblique muscles.

"As is well known, the function of the oblique muscles is to keep the naturally vertical meridians of the two corneæ parallel even when not vertical, [except in cases of uncorrected oblique astigmatism, as shown in Vol. 1, No. 1 of the *Ophthalmic Record*]. This must be, or a troublesome form of double vision will result. If there is perfect equilibrium of the obliques, this parallelism of the meridians named is maintained without trouble; but if the superior oblique of either eye be too strong for its inferior, or vice versa, the parallelism of the vertical meridians is preserved, and double vision prevented, only by excessive work on the part of the weaker muscles. This condition of the oblique muscles brings on, at longer or shorter intervals, a train of nervous symptoms for which, at present, I can see no hope of prevention or cure."

.As can be readily seen the condition described then was *symmetrical insufficiency of the obliques.* Up to that time I had not seen, nor had I heard of, a case of *non-symmetrical insufficiency of the obliques.*

Dr. Moulton, however, reported such a case in a letter* to the editor of the *Ophthalmic Record.* I had reasoned that such a condition would not give trouble, since the strong muscles would be allowed to act, thus revolving the two eyes in the same direction, but causing no disturbance of vision. I still believe this reasoning correct except in cases of corrected astigmatism. Such a case Dr. Moulton reported, asking for an explanation of the fact that it became necessary for him to rotate his 1.00 D. cylinders from 90° to 100°, in order that the patient might have comfort, when several examinations under atropia had shown that the axis of each cylinder should be at 90°. My explanation, published in connection with his letter, was that there was insufficiency of the superior oblique of her right eye and the inferior oblique of her left eye; that these weak muscles, at the times of the several examinations, exerted their full amount of power and thus kept the best meridians at 90°; that these muscles at other times, because of fatigue, could not exert the necessary amount of power, and thus allowed their stronger

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*See *Ophthalmic Record*, Vol. 1, No. 4, 1891.

opposing muscles (the inferior oblique of right and superior oblique of left) to change these meridians from 90° to 100°. It was at such a time as this that the Doctor learned that the axes of his cylinders should be placed at 100°. Comfort came to, and remained with, his patient as a result of this little proceedure. It was good practice and should be followed in all cases of astigmatism where there is *non-symmetrical insufficiency of the obliques.*

In *symmetrical insufficiency of the obliques* the case is very different both in principle and practice. It is for this latter condition that I am now able to point out the remedy.

To illustrate clearly the principle and practice I will take up for study the case of J. B M., age thirty-five, whose case I was studying the moment the thought of the cure came to me. Two years ago he came to cousult me about a headache that for a long time had troubled him, and which was growing more severe. He had been advised that it was probably due to eye-strain and if so, it could be cured by properly adjusted lenses. A preliminary examination showed only a slight error of refraction. This he consented to have corrected, hoping that he would get relief, other means having failed. Under homatropine the following correction was given:

O. D. V. = $\frac{20}{XX}$ with + .25 ⊂⊃ + .25 cyl. ax. 155°.
O. S. V. = $\frac{20}{XX}$ with + .25 ⊂⊃ + .50 cyl. ax. 90°.

It was determined at the same time that he had $\frac{1}{2}$° left hyperphoria. It was also determined that he had insufficiency of both right and left superior obliques. He was told that all but the latter could be corrected; that he would get some, but not complete, relief by wearing his sphero-cylindrical lenses, the left ground on a prism of $\frac{1}{2}$° base down; that, at times, the insufficiency of the obliques would give him trouble for there was nothing that could be done for this condition. I did tell him, that, if, when engaged in near work, he felt a headache coming on, he might cover one eye with a flap thus doing away with the strain necessary for harmonious action of the muscles of the two eyes. This he tried occasionally, but found it very inconvenient to work with one eye only. His attacks of suffering were greatly lessened in both frequency and severity for some months, as a result of the elimination of some of the factors formerly constituting the cause of his suffering.

He wore his spectacles continually, but after a while his headaches began to return. They grew more frequent and more severe untill he became an almost daily sufferer. Not infrequently on going home from his office his wife would have to put him to bed like a child. He would occasionally take medicines prescribed by his family physician to relieve the severity of the attack.

At intervals, during the whole time, he would consult me. When complaining I would tell him that I believed that the then-active cause was the insufficiency of his superior obliques, and that I was powerless to do more than I had already advised. A few months ago I made a second examination of his eyes under the influence of homatropine, but only to find that the result of my former examination was correct. I did not have to urge him to wear his glasses, because he had learned that he was more comfortable with than without them.

On the 13th of May, 1882, he came to me and said that I must do something more for him; that he must have relief. Reminding him that I had twice investigated his eyes and each time had found the same conditions and had corrected all that was correctable, I told him I was willing to try again, but that I was now as unable to correct the insufficiency of his obliques as I ever was. In the course of this conversation I told him if he had but one eye he would not be a sufferer. Deciding that it would be four days before he could return for another examination he went away. On the 17th at the hour appointed he came; and without hope of finding an additional means of relief, I under-took the investigation again. The results of former examinations as to lenses were confirmed.

My study of the recti muscles resulted as formerly in finding a left hyperphoria of $\frac{1}{2}^{c}$. With the remark "we will now look into that incorrectable condition," I began to investigate the obliques. Placing the 6^{c} double prism before his right eye, the left eye (the one under test) showed the middle line dipping unmistakably to the right, as in Fig. 1, thus showing insufficiency of the left superior oblique. Transferring the double prism to the left eye, the right eye showed the middle line dipping to the left, as in Fig. 3, thus showing insufficiency of the right superior oblique. Having stated again that nothing more could be done for him, in a moment the thought occurred to me that, if a cylinder were placed before the eye in such a way as to make the line incline still more in the same direction, on removing the double prism the weak obliques would have to act more than usual in binocular vision. I reasoned that this over-action being in the nature of gymnastic exercise, if conducted properly must develop the weak muscles, and thus be a source of relief to the patient. Leaving the double prism in front of the right eye I placed a + 2.00 cylinder before his left and revolving it so as to bring its axis to 135° the middle line was seen to dip 'very much more to the right. I then turned the axis back to 90° when the dipping was the same as when no cylinder was on. Turning the axis of this cylinder to 45° the middle line was made parallel with the other two (this little proceedure of placing the axis of a cylinder obliquely first in one direction then in the other, and watching the effect on the middle line will establish or disprove the correctness of the diagnosis). The diagnosis made and positively confirmed, I at once commenced the gymnastic exercise by placing a + 2.00 cylinder before each eye, the axis of the right at 70° and the axis of the left at 110°. The patient was asked to fix his vision on a candle twenty feet distant (the double prism had been removed). In three minutes the axis of right cylinder was turned to 60° and that of the left to 120°; three minutes later the axis of right was placed at 50° and that of left at 130°; and again in three minutes the axes were changed, the right to 45° and the left to 135°. With each turning there was additional demand made on the superior obliques, the maximum being reached when the axes were respectively at 45° and 135°. With each turn the patient could feel additional strain. The cylinders were allowed to remain in this position of maximum effect three minutes when they were removed and the double prism test was applied. There was the slightest, if any, dipping of the middle line. Both patient and practitioner felt encouraged. He has returned daily for the *exercise* which has been conducted every time in the manner above described.

On the day after the first *exercise* he resumed his office work which requires almost continuous near use of his eyes, and has been absolutely comfortable up to this time—the end of the eleventh day—and not one dose of medicine has been taken. For the last three days before beginning the *exercise* the test when applied to either eye showed but little, if any, want of parallelism of the lines. His improvement has been rapid and remarkable.

I have now under the exercise treatment a little girl, age fifteen years, whose trouble is insufficiency of the inferior obliques. The dipping of the middle line is to the left in the left eye, and to the right in the right eye, just the contrary of what was found in the other case.

The *exercise* in her case is carried on by revolving spasmodically the axis of the right cylinder from 90° to 135° and that of left from 90° to 45°, the reverse of the plan in the first case. She does not bear the exercise so well as the first patient, but her improvement in five days is noticable.

My records for the past two years show a number of cases of *symmetrical insufficiency of the obliques*, to all of whom I stated: " for this condition I can do nothing."

The condition is real, the treatment is rational, and relief must follow. The condition is easy of detection and the insufficient muscle can be quickly located. The double prism before the right eye, the middle line is seen by the left (the one under test); if it dip towards the opposite (right) side the superior oblique is insufficient (see Fig. 1), if towards the same side the inferior oblique is insufficient (see Fig. 2). The same is true when the right eye is under test as is shown in Figs. 3 and 4 In the treatment either concave or convex cylinders can be used; if the concave are used and the insufficiency is in the superior obliques the axes must be placed in the lower nasal quadrant, if in the inferior obliques then the axes must be placed in the lower temporal quadrant. If for the exercise the convex cylinders are chosen the axes must be placed in the lower temporal quadrant for insufficiency of the superior obliques and in the lower nasal quadrant for insufficiency of the inferior obliques. In either case the effect is increased as the axis is made to move from the vertical to the point of maximum effect which is 45° from the vertical.

The exercise may be commenced with a .50 to a 1.00 D. cylinder, and increased each day a .50 D., up to 3.00 D. The cases will be very rare that will require a stronger exercise cylinder than the last named. The graduated exercise should be continued daily. Each eye being affected, the exercise cylinders should be placed before both.

CALCAREOUS FORMATIONS IN THE EYE,

By J. E. MINNEY, A.M., M. D.,

Professor of Ophthalmology and Otology in the Kansas Medical College,

Topeka, Kansas.

Read before the Section of Ophthalmology of the Kansas State Medical Society, at Ft. Scott, Kansas, May 4, 1892.

Calcareous deposits are generally found in dead tissue or where the vitality is low.

They do not destroy the structure of the organ, but are deposited within and include the structure. When the calcareous matter is removed, the histological tissue formation can be recognized. A bony formation indicates life, growth; whereas the calcareous deposit denotes death.

The probability is that these "bony or calcareous masses have their origin in 'little colloid bodies' found in the surface of the lamina vitrea." According to Alt these vitreous bodies may be the starting point of osseous plates upon the inner surface of the choroid. Their true nature has not been determined.

Lime deposits are common in the various tissues of the body. When found outside of the bony structure where it is normal, it is identical with the lime found in the bones. It is supposed to be held in solution in the fluids of the body by the presence of carbon-dioxide.

There is a metastatic calcification described by Virchow.

In multiple caries with rapid destruction of bone, or sarcoma affecting the bone, post-mortem has revealed calcification of portions of the lungs, of the kidney and intestines. This explains how stony concretions have been coughed up from the lungs.

Lime salts are held in solution in the fluids of the body and are readily precipitated.

When these fluids come in contact with obsolete tissue there is stagnation and there may be a consequent deposit of lime. Probably the quiescent state of the fluid in contact with the dead or dying tissue renders it more alkaline and favors the deposit.

In old cases of irido-choroiditis there is sometimes a lime deposit. In such cases the iris is firmly adherent to the lens and atrophied.

The lens may become a stony mass throughout its whole extent. These deposits are usually carbonate of lime.

The nucleus may be a foreign body lodged in the part, or these stony concretions may follow an injury, illustrated by the following cases.

Case I. W. B. L.——, age 25, white, American—married—telegraph operator of McPherson, Kansas. He was injured July 1, '76, by a piece of gun cap hitting him in the eye at the junction of the upper and lower quadrant of the cornea at its margin, penetrating the globe. The sight gradually disappeared and in the fall of '76 he visited Dr. Holmes, of Chicago, who advised enucleation, which was refused. It gave him but little trouble if any, up to November 10, '87, when pain set in. This history was given November 22, '87, when Dr. J. R. Fay brought him to my office.

The good eye pained him so that he could not work. Vision $\frac{20}{\text{XL}}$. The pupil was dull and responded but little to the light and in fact iritis serosa was present. There was total loss of vision in the injured eye. The pupil was occluded and there was complete anterior synechiæ. The globe was irregular and phthisical.

The eye was enucleated. The irregular shape of the globe was due to calcification of the lens as you will see by inspection. This specimen is the enucleated eye. (It was passed around.) You will observe that the stony formation is in the site of the lens. It measures 16 mm. in its long diameter; 10 mm. at its wide, and 7 mm. at the narrow end, and averages 4.5 mm. in thickness.

The vitreous, retina and choroid had broken down and the space was occupied by a dark grumous fluid.

Case II. Mr. J. G.——, age 54, German—married, farmer, Salina, Kansas. He was injured in the left eye 40 years ago by the tine of a pitchfork. The sight of the eye was lost immediately.

The eye never gave him any pain, but has always been tender on pressure.

The sight in the right eye began to fail two years ago, when he resorted to spectacles, which did not clear the vision perfectly In November,'91, vision failed him so that he could not see to read

Examination of the left eye (the injured one) showed phthisis bulbi, well marked.

Ciliary injection, with a leash of vessels extending obliquely across the cornea from an old cicatrix, upwards and inwards. The point of injury was in the cornea in the lower and outer border involving the ciliary region, as shown by the cicatrix at that point.

The globe was flattened in the lower meridian. Pressure on it gave pain and continued pressure produced an uneasy sensation in the other eye.

The right eye was tender on pressure and slight manipulation produced ciliary injection. There was also incipient cataract and the iris dilated sluggishly under the influence of atropine.

This history and examination was obtained and made by Dr. R. S. Magee, Jan. 7, '92, in consultation with Dr. Wm. B. Dewees, his family physician, and enucleation of the injured eye was advised.

On Feb. 4, '92, accompanied by his physician he called at my office. Examination showed the above conditions present and the necessity of an enucleation confirmed.

The eye was removed by Dr. Magee the same day.

The tine of the pitchfork evidently entered at the cicatrix above mentioned, passing entirely through the eye-ball, making its exit at a point just behind the equator and to the inner side of the optic nerve as indicated by a cicatrix at this site, showing that the direction of the tine had been backwards, inwards and slightly upwards.

The posterior half of the globe felt firm and hard to the touch as if some cup-shaped substance was within, the sclera moving upon it, as you will see. (The eye was passed around.)

Section of the globe showed a stony calcareous deposit, a complete hollow cast of the posterior half of the eye-ball, measuring 21 mm. across its greatest diameter; 18 mm. across its narrowest diameter and 10 mm. in depth, this includes the thickness of the bottom of the cup, averaging 2 mm. in thickness throughout.

A STUDY OF THE RELATIVE EFFECTS OF HOMATROPINE AND OF ATROPINE ON THE ACCOMMODATION OF THE ASTHENOPIC EYE.

Written for the Ophthalmic Record by

W. E. BAXTER, M.D.,

Surgeon to the Eastern Maine Eye and Ear Infirmary, Ophthalmic and
Aural Surgeon to the Home for Aged Women,

BANGOR, MAINE.

The studies of the effect of homatropine on the accommodation of the human eye have brought forward so many varied opinions from men known to be skilled and careful observers, that the paralyzing power one may expect from its use is still problematical, if one depends on the literature of the subject for information. The cases that I give below show the effect of homatropine on the accommodation and muscular balance of the asthenopic eye, and being followed by the use of atropine, show the relative effects of each drug.

I have been one of the many who have depended on atropine as a mydriatic in asthenopia of the young, and realizing its disadvantages that are so considerable as to prohibit its use in many cases, these experiments have been made to satisfy myself as to the effects of homatropine preparations. Before commencing these examinations, I must confess that I had but little faith that in homatropine a substitute for atropine would be found, but I have been pleasantly disappointed and shall continue to use the discs of homatropine with great confidence in those refractive troubles demanding a mydriatic, if the patient cannot give the time required for an atropine examination, believing that by this agent, the refraction can be obtained correctly enough in the great majority of asthenopic cases, but I shall continue to use atropine in the majority of cases requiring a mydriatic, if the patient can give the time required for such an examination, believing that the prolonged rest from eye work necessitated by this agent is beneficial in these cases, and a prolonged period of relaxation is particularly desirable when a week at least must elapse between the time of giving the prescription for the glasses and the receipt of the same.

In the examinations, Wyeth's discs of homatropine and cocaine alkaloid, each containing 1–50 of a grain of both of these drugs, as suggested by Dr. Wood, have been used, followed by a one per cent solution of sulphate of atropine used for two or three days. In the examinations, the following methods have been employed. The refraction has been estimated by the ophthalmoscope and verified by the test lenses, care being taken to correct any astigmatism to within a quarter of a diopter. The muscular balances have been found by the phorometer, using Stevens rotary slide, and the light furnished by a three candle power electric lamp situated six meters distant (this lamp is connected by wires under the floor with a transformer situated behind my refraction chair, and lighted by turning a button which throws the street current through the transformer); the strength of the ocular muscles has been measured by Risley's rotating prism held in a trial frame. At the first examination, a record was made of the vision, refraction, muscular balances and strength of the ocular muscles. A disc of homatropine and atropine was then put into each eye and repeated in half an hour. At the expiration of an hour, the eyes having been closed during this time, another examination was made in the same manner as the first and the results recorded. The patient was then given a one per cent solution of atropine to be used four times a day for at least two days, when another examination was made in the same manner as the two previous ones.

The following cases occurring in my private practice, are the first ones that have been so examined. I have made quite a number of examinations in the same manner since, and find that the results are practically the same.

Case I. Miss P., Scholar, age 12. After going to school for several weeks has headaches, frontal in character.

V. right eye, 6–12; + .5 D. c. 90° 6–6. Adduction 20.

V. left eye, 6–6; + .25 D. c. 90° 6–6. Abduction 6. Esophoria 2

Discs of homatropine and cocaine used and one hour later:

V. right eye, 6–9; + 5 D. s. ⊃ + .75 D. c. 90° 6–6. Adduction 28.

V. left eye, 6–6; + .5 D s. ⊃ + .25 D. c. 90° 6–6. Abduction 6. Esophoria 2.

Solution of atropine used and three days later:

V. right eye, 6–30, + 1.5 D. s. ⊃ + .5 D. c. 90° 6–6. Adduction 30.

V. left eye, 6–20; + 1.5 D. s. ⊃ + .25 D. c. 90° 6–6. Abduction 6. Orthophoria.

Case II. Miss W., student, age 15. Cannot use eyes any for near work.

V. right eye, 6–9; + .25 D. c. 90° 6-6. Adduction 20.

V. left eye, 6–6; + .25 D. c. 90° 6-6. Abduction 7. Esophoria 4.

Discs of homatropine and cocaine used and one hour later:

V. right eye, 6–20; + 1.5 D. s. ⊃ + .25 D. c. 90° 6–6. Adduction 20.

V. left eye, 6–30; + 1.5 D. s. ⊃ + .25 D. c. 90° 6–6. Abduction 7. Esophoria 4.

Solution of atropine used and three days later:

V. right eye, 6–60; + 2· D. s. 6–6. Adduction 30.

V. left eye, 6–60; + 1·75 D. s. 6–6. Abduction 1½. Esophoria 2.

Case III. Miss H., seamstress, age 16. Eyes have troubled her about using for years.

V. right eye, 5–15; + 1.5 D. c. 180° 6–12. Adduction 35. R. Hyperphoria 2.

V. left eye, 6–15; + 1.5 D. s. ⊃ + .75 D. c. 180° 6--12. Abduction 5. Esophoria 14.

Discs of homatropine and cocaine used and one hour later:

V. right eye, 3–60; + 4.5 D. s. ⊃ + 1.5 D. c. 90° 6–9. Homonymous Diplopia.

V. left eye, 4–60; + 4. D. s ⊃ + 1.5 D. c. 90° 6–9. Hyperphoria 2.

Solution of atropine used and two days later:

V. right eye, 4–60: + 5. ⊃ + 1.25 D. c. 90° 6–6. Adduction 25.

V. left eye, 6–60: + 4. D. s. ⊃ + .3 D. c. 90° 6–6. Abduction 4. Esophoria 7.

Case IV. Miss H., scholar, age 15. Has had headaches for years, worse when she uses eyes. The pain extends into back of head and left side of neck.

V. right eye, 6–6; better with 1 D. Adduction 15.

V. left eye, 6–6; better with .5 D. Abduction 9. Esophoria 1.

Discs of homatropine and cocaine used and one hour later:

V. right eye, 6–20; + 2. D. 6-6; Adduction 24.

V. left eye, 6–15; + 1.5 D. 6–6. Abduction 5. Esophoria 2.

Solution of atropine used and three days later:

V. right eye, 6–60; + 2. D. s. ⬭ .5 D. c. 90° 6–6. Adduction 15.

V. left eye, 6–60; + 2. D. s. ⬭ + .5 D. c. 90° 6–6. Abduction 10. L. Hyperphoria ½.

Case V. Mrs. H., student, age 21. Cannot use eyes; has headaches, also neuralgia in temples when she uses eyes.

V. right eye, 6–9; no improvement with glasses. Adduction 8.

V. left eye, 6–6; no improvement with glasses. Abduction 7. Exophoria 1.

Discs of homatropine and cocaine used and one hour later:

V. right eye, 6–9; + .5 D. s. ⬭ + .5 D. c. 90° 6–6. Adduction 10.

V. left eye, 6–9; + .5 D. s. 6–6. Abduction 8. Exophoria 10.

Solution of atropine used and three days later:

V. right eye, 6–30; + 1.25 D. s. ⬭ + .75 D. c. 90° 6-6. Adduction 9. L. Hyperphoria ½.

V. left eye, 6–30; + 1.5 D. s. ⬭ + .5 D. c. 90° 6–6. Abduction 7. Exophoria 2.

Case VI. Mr. S., book-keeper, age 19. Subject to headaches; has had to give up college studies; was fitted with glasses under a mydriatic in Boston a year ago, but on leaving off glasses for a while could not see well through them when he returned to their use.

V. right eye, 6–20; — .1 D. s. 6–6. Adduction 24.

V. left eye, 7–30; — 1.25 D. s. 6–6. Abduction 6. Esophoria ½.

Discs of homatropine and cocaine used and one hour later:

V. right eye, 6–12; — .5 D. s. 6–5. Adduction 24.

V. left eye, 6–15; — .75 D. s. 6–5. Abduction 5½. Esophoria 1.

Solution of atropine used and two days later:

V. right eye, 6–20; — .75 D. 6–6. Adduction 28.

V. left eye, 6–30; — 1 D. 6–6. Abduction 4. Esophoria 1½.

Case VII. Mrs. S , age 36. For the last year and a half has been troubled with headaches; when she uses eyes has pain in spots.

V. right eye, 6–6; no improvement with glasses. Adduction 7.

V. left eye, 6–6; no improvement with glasses. Abduction 7. Exophoria ½.

Discs of homatropine and cocaine used and one hour later:

V. right eye, 6–12; + .5 D. c. 90° 6–6. Adduction 8.

V. left eye, 6–12; + .5 D. c. 90° 6–6. Abduction 7. Exophoria ½.

Solution of atropine used and three days later:

V. right eye, 6–12; + 1 D. 6–6. Adduction 15.

V. left eye, 6–12; + 1 D. 6–6. Abduction 6. Orthophoria.

Case VIII. Mrs. H., age 23. Subject to headaches. Last year when using eyes, blur came before them, and has not been able to use them since.

V. right eye, 6–6; no improvement with glasses. Adduction 5.

V. left eye, 6–6; no improvement with glasses. Abduction 8. L. Hyperphoria ½.

Discs of homatropine and cocaine used, one hour later:

V. right eye, 6–9; +.5 D. 6–6. Adduction 2.

V. left eye, 6–9; + .5 D. 6–6. Abduction 8. Exophoria 1.

Solution of atropine used and three days later:

V. right eye, 6–12; + .5 D. s. ○ + .25 D. c. 90° 6–6. Adduction 3. L. Hyperphoria ½.

V. left eye, 6–9; + .5 D. s. ○ + .25 D. c. 90° 6–6. Abduction 6. Exophoria 1.

Case IX. Miss L., painter, age 25. Has had headaches for years, worse in using eyes.

V. right eye, 6–9; no improvement with glasses. Adduction 20.

V. left eye, 6–9; no improvement wits glasses. Abduction 3. Esophoria 2.

Discs of homatropine and cocaine used, one hour later:

V. right eye, 6–9; no improvement with glasses. Adduction 22.

V. left eye, 6–9; no improvement with glasses. Abduction 3. Esophoria 2.

Solution of atropine used and three days later ;

V. right eye, 6–22; + .5 D. 6–9. Adduction 24.

V. left eye, 6–9 ; + .5 D. 6–9. Abduction 3. Esophoria 1½.

Case X. Mr. D., teacher, age 28. Headaches most of the time. Cannot use eyes for more than one half an hour without neuralgic pains in them.

V. right eye, 6–9: + .5 D. c. 90° 6–6. Adduction 25.

V. left eye, 6–9; + .25 D. c. 90° 6–6. Abduction 6. Orthophoria.

Discs of homatrophine and cocaine used and one hour later:

V. right eye, 6–20; + 1 D. s. ⊂⊃ + 1 D. c. 90° 6–6. Adduction 28.

V. left eye, 6–20; + 1.5 D. s. ⊂⊃ + .5 D. c. 90° 6–6. Abduction 6. Orthophoria.

Solution of atropine used and three days later :

V. right eye, 6–30; + 1.25 D. s. ⊂⊃ + 1 D. c. 60° 6–6. Adduction 30.

V. left eye, 6–30; + 2. D. s. ⊂⊃ + .75 D. c. 90° 6–6. Abduction 7. Orthophoria.

AN INTERESTING CASE OF GONORRHŒAL OPHTHALMIA.

Written for the Ophthalmic Record by

HOWARD McILVAIN MORTON, M.S., M.D.,

MINNEAPOLIS, MINN.

Dr. Chisolm, in his opening address before the Ninth International Medical Congress, said : "There is no disease of the eye so thoroughly mastered that further information is not desired." With this thought before me I venture to report a case that may be of some interest. While gonorrhœal infection of the eyes is by no means an uncommon disease for the oculist to meet with, any deviation from the usual history and progress of the affection is worthy of note. There are two points to which I beg leave to draw your attention.

· First: Gonorrhœal infection in a globeless orbit, and brought about through the medium of an artificial eye.

Second: The appearance of Delerium Tremens, probably excited by reflex irritation from the gonorrhœal disease in the eye. I shall report the case as I find it in my case book.

"On April 27, was called by Dr. Smith, of St. Anthony Hospital, to see Harry L——, bar-tender, æt. 34. Man has a severe gonorrhœal infection of left orbit. Says, his eye was injured at 15 years of age. Has extreme degeneration of globe and one would think, at first sight, that enucleation had been performed. Has been wearing an artificial eye for several years. On April 20, he found that he had contracted gonorrhœa and on the 26, his eye began to pain and smart. The process had developed rapidly and now presents the characteristic discharge and velvety appearance in the entire cul-de-sac. The disease seems to manifest itself more decidedly in the posterior folds of the conjunctiva rather than palpebral, and the lids were much less swollen than is often the case. *The infectious material had been conveyed from the fingers through the agency of the artificial eye.* He was put to bed, cold compresses ordered and conjunctiva washed with 1—1000 bichloride sol. On second day the man was taken with acute mania, and had to be placed in a private room. Since he had denied most positively the excessive use of alcohol and had no tremor, I was constrained to ascribe his condition to worry and reflex irritation resulting from the disease. On the fourth day having had no elevation of temperature and developing unmistakably the alcoholic tremor, the case was made clear. I have not been able to find any reference to gonorrhœal infection through this source in any of the standard ophthalmic works.

51 and 52 Syndicate Block.

SCIENTIFIC PROCEEDINGS OF THE SECTION OF OPHTHALMOLOGY OF THE A. M. A.

At Detroit, Mich., June, 1892.

ABSTACT OF A PAPER ON "FACIAL EXPRESSIONS AS INFLUENCED BY THE OCULAR MUSCLES,"

BY GEO. T. STEVENS, M.D.,

NEW YORK.

In the course of some years of close observation of the anomalies of the muscles which govern the movements of the eyes, the fact that remarkable changes often follow the modification of these muscles, led me not only to regard with greater care these facial changes, but to bring to the subject the aid of photography. Photographic portraits of more than 2000 persons have been taken, the records of whose ocular muscle conditions have been carefully and repeatedly made.

We have thus, for the first time, a series of observations in which the facial expressions are registered by photography while pains-taking determinations of the ocular muscle conditions are faithfully recorded. The result of the study has been to demonstrate that certain well-defined types of facial expression are not only associated with, but are dependant upon, certain relative tensions of the ocular motor muscles. With the state of equilibrium of the eye muscles, Orthophoria, the expression is one of greater repose than with any of the states of Heterophoria. The eye-brows form each a moderate and regular curve, marking the border of the orbit, the lower border of the brow corresponding to the orbital border. The inner extremity decends towards the nose, but does not turn downward into the depression bounded by the nose and the orbit.

There is no sharp turn or curve at either extremity. The mouth is nearly horizontal or curving very slightly upwards at the centre. The lips in repose are firm but not compressed, and the upper one is well proportioned. The chin is rounded, neither square nor pointedly oval. The lines of the forehead are not especially conspicuous. The facial lines are moderately spreading. With esophoria the brows are compressed, the extremities often curve suddenly downwards, the inner extremity sinking into the depression bounded by the nose and orbital border. The palpebral fissure is usually less widely open than in orthophoria or exophoria. The lips are firm, the upper one short. The posterior portion of the alæ of the nose drawn slightly upward, the superficial lines or groves upward from nose, erect and distinct; especially in middle life and later, transverse lines upon the forehead low; the naso-labial and cantho-malar groves spreading. The lower part of the face is broad.

With exophoria the brows are usually raised, often strongly arched; palpebral fissure often wide; upper lid rather conspicuous; upper lip long; corners of the mouth often drawn up and mouth curving down at the centre; lower part of the face usually narrow; principle groves of the face more vertical than with esophoria. The transverse lines on the forehead are mostly above the centre, hyperphoria is characterized by irregular features. On the side the visual line of which tends to rise above the other, the brow is depressed, while the brow of the side whose visual line tends downward is elevated. Thus the brow and neighboring tissues of one side, aid in depressing the front of the eye while on the other hand, by the elevating of the opposite brow, less demand is made upon the muscle which rotates that eye upward. These contrary actions demanded by the relations of the visual lines in hyperphoria, affect the whole face, resulting in a want of harmony of the two sides. The angle of the mouth on the side on which the brow is depressed, is drawn upward, while the other angle is depressed. Thus one side of the face appears longer than the other.

There are a number of sub-types depending upon hyper-esophoria and hyper-exophoria. While there are apparent exceptions to these rules, as to most rules, and while the bony structure must give to the face its general form, the law is very general.

The recognition of these types of expression is useful to the oculist as well as to the artist. Any one of the types may be modified or transformed to another type, by modifications of the relative tensions of the muscles which rotate the eyes.

ABSTRACT OF A PAPER ON "THE ¼° PRISM IN THE CORRECTION OF HYPERPHORIA,"

By A. E. PRINCE, M. D., Springfield, Ill.

The paper of Dr. Prince, on the fourth degree prism in the correction of hyperphoria, consisted of a selection of cases illustrating the importance of detecting and correcting minimum degrees of hyperphoria in cases of asthenopia, headache, neuralgia, drowsiness, dizziness, lacrymation, conjunctival hyperæmea, etc., in which a no more apparent cause is found to account for the discomfort. The subject was illustrated by extracts from twelve cases selected to illustrate a variety of types of discomfort, in which the correction of so small an error has been found to counteract the symptoms.

Case 1st. Asthenopia and headache of five years standing. Emmetropic; hyperphoria one-half degree. relieved by one-fourth degree prism for each eye.

Case 2nd. Asthenopia and photophobia, with emmetropia. One-fourth degree left hyperphoria, relieved after eight years by one-fourth degree prism before left eye

Case 3rd. Asthenopia and photophobia with + .50 c. 90°, right hyperphoria, relieved by one fourth degree prism before right eye, after cylinder correction had failed.

Case 4th. Repeated conjunctival hyperæmia treated several times for conjunctivitis and granulated lids, during a period of seven years, relieved by one-fourth degree prism base downward before the right eye, and upward before the left eye.

Case 5th. Rapid nictitation with emmetropia, corrected by one-fourth degree prism before each eye.

Case 6th. Asthenopia with astigmatism, left hyperphoria one degree, and esophoria nine degrees, relieved by one fourth degree, base downward before the left eye, and upward before the right, ground with astigmatic correction after this had failed, still ignoring the large degrees of esophoria.

Case 7th. Asthenopia, headache and neurasthenia, with emmetropia, relieved by one-fourth degree prism before each eye.

Case 8th. Drowsiness coming on during the day, associated with burning of the lids, emmetropia; relieved by correction of one-fourth degree right cataphoria.

Case 9th. Epiphora, two years standing, emmetropia; relieved by one-fourth degree prism each eye.

Case 10th. Migraine of severe type, with — .75 c. 180°. Right hyperphoria one degree, relieved completely by one-fourth degree each eye on cylinder correction; one-half degree was not found comfortable.

Case 11th. Burning of lids, and headache corrected by one-fourth degree prism before each eye.

Case 12th. Asthenopia with hypermetropia and presbyopia cured by decentering to effect one-fourth degree prism each eye.

The following matters of detail are urged to secure the greatest possible degree of precision.

First: Secure a perfect *Maddox rod* test, which is thought to be superior to Stevens for these delicate measurements: First, because the images on the retina are entirely dissimilar and have no tendency to blend. Second, from the fact that they can be superimposed thus facilitating comparison, which is especially important in the detection of small degrees of error. Third, because comparison is more readily made between the hyperphoria and equivalent corresponding cataphoria, thus eliminating errors of observation of statement.

From the fact that these rods are drawn, a certain portion of them are slightly conical, which can be detected by inverting the rod before the normal eye. Next, see that the rod rests vertically in the trial frame, or, better, have it mounted so as to rest in a horizontal bar independent of the face.

Still further to increase the efficiency of the method, at my suggestion F. A. Hardy & Co. have, in process of manufacture, a phorometer, the essential portion of which consists of two 3° prisms, which rotate in opposite directions, over one another so as to present before the rod every fraction of a degree from 0, when they are neutralized to six degrees, when they act together. An arc is graduated to one-eight degree, so that the refraction can be accurately read off, as well as the nature of the error, whether it be esophoria, exophoria or right or left hyperphoria.

Second: make the point of observation the smallest compatible gas jet. By doing this a narrower light streak is observed, which, when the rod is in the vertical position before the eye, should, in the absence of hyperphoria, exactly cut the flame.

Third: place the gas jet or taper before a dark back ground, which will increase the capacity of the patient to detect a small error. On several occasions hyperphoria has been overlooked, and other errors which were present corrected, later to find upon more careful observation with a reduced light and dark background, that one or two quarters were present, the correction of which gave relief.

Fourth: compare the hyperphoria with the corresponding cataphoria, to which it should be equivalent. In event of discrepency in these cases, it has been found the best practice to correct the smallest degree in the trial frames, and test again to ascertain if more becomes manifest.

Fifth: Following the suggestion of others it is believed, that a much larger percentage of satisfaction can be secured by being provided with a variety of light steel frames, with bridges of various heights and prominence, supplied with long screws to facilitate changing of prisms, which should be worn for a time, varying from a few hours to a few days, either with or without such other correction as may be present, in order to ascertain whether the prism in question is acceptable to the patient. Each case is a law unto itself. Some cases will be found in which the heterophoria is provisionally corrected with comfort to the patient, by the muscular adjustment, while in others an error of one-fourth degree will require a corresponding prism before relief will be obtained. The weight of the trial frames usually employed is often so great as to vitiate an observation, and lead the patient to pass judgment against the prism, which, had the light, well fitting frame been employed, would have been reversed.

A word may not be amiss concerning the measurement of the weak prism. whereby the physician may be assured that his prescription has been accurately filled by the optician. There are various methods known to the mathematical optician which are impracticable in the practice of the physician, who, must, more than likely, rely on the method of neutralization. To this end, as well as in the original detection of the error, I have found the Maddox Rod to serve best. Knowing the prismatic error possessed by oneself, and having corrected it, the rod causes the ray of light to appear to cut the flame seen by the fellow eye. The glass in question is now held before the eyes, when an appreciable vertical displacement will occur. The neutralizing glass is now placed before the glass to be tested when the equilbrium will be restored. This method is simple and can be operated by anyone having good binocular vision, and an approximation to orthophoria.

DISCUSSION OF DR. PRINCE'S PAPER.

Dr. Gradle:—The significance of any results diminish rapidly as their numerical value approaches that of the errors of observation incidental to the method. In criticising this paper, I would simply call attention to the fact that a slight inaccuracy in the horizontal position of an ordinary pair of glasses, produce angular deviation of image far in excess of those produced by such weak prisms.

Dr. Risley:—I wish to call attention to an error which occasionally occurs in the construction of lenses, viz., that the sphero-cylinders are not ground on glass with parallel surfaces. In one instance the resulting prismatic error amounted to 2°.

Dr. Prince closing :—In answer to the hypothetical objection that many glasses are worn with comfort which from fault of lenses or frames are decentered so as to effect a prismatic action greater than ½°, it is sufficient to say that a great number of cases occur who are unable to work with freedom from strain after a spherical correction has been made, who are rendered comfortable by slightly decentering the lenses by readjusting the frames. The fact that the great majority of persons can wear badly fitting glasses does not miliate against the claim that a few demand the absolute centering in the vertical meridian.

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ABSTRACT OF A PAPER

ON "THE METHOD AND RESULTS OF SIMPLE CATARACT EXTRACTION,"

By H. KNAPP, M.D., New York.

Dr. Knapp's remarks are based on 683 extractions performed by him during the last six years. 623 were without, 60 (10%) with, iridectomy. All cases are included. He considers ripening operations as superfluous: prefers the risk of removing immature cataracts to that of artificial ripening; avoids, however, operating on cataracts swollen by imbibition. The patient is operated on upon a chair, under asceptic precautions, and when the operation is over, undresses and goes to bed with his eyes open. In from five to thirty minutes Dr. K. inspects his eye again, and when the wound and iris are all right he applies the bandage which consists of a piece of moistened corrosive sublimate gauze and absorbent cotton fastened by two strips of isinglass plaster. Of 125 successive cases treated in that way, one showed, at the inspection, a distorted pupil (which was made round again, by stroking the iris back, but the patient had a subsequent prolapse), and two incarcerations of the iris, for which iridectomy was made on the spot; recovery undisturbed.

The most important step of the whole operation is the corneal section. For ordinary cataracts it should comprise half the circumference of the cornea, pass strictly through the transparent margin, rather trespassing on the cornea than on the sclerotic, the knife remaining in the same plane from begining to the end of its course, the least turning on its axis being carefully avoided. Such sections close and heal admirably.

The *capsule* is opened with a delicate cutting cystotome, behind the iris, parallel to the corneal section: removal of a piece of anterior capsule is confined to the thickened center of hypermàture cataracts.

The *lens is expelled* by pressing with a Daviel spoon on the lower edge of the cornea. In restless patients and when prolapse of vitreous is imminent, I remove the fixing forceps and speculum, and press the lens out by a pressure with the lids. Scarcely have I had to resort to traction instruments. The remnants are pushed into the wound with the lids and wiped off with a stirilized silver spatula. Neither the edges of the lids nor any instruments that have touched the cornea or anything else should touch the wound. The iris if not spontaneously falling back, is reduced with an olive tipped probe from under the transparent corneal margin. If there is any difficulty, and in all peripheric sections, it is advisable to make a small iridectomy. In five or six hours the pain disappears. If later it suddenly re-appears but passes in about an hour, prolapse of iris, in all probability, has occured. When it is brought to my notice soon, I open the eye and cut the prolapsed iris, otherwise deal with it later on. For a time I cut the prolapse as soon as I noticed it, commonly on the fourth day: the results were unfortunate.

Besides good recoveries there was one loss by suppuration and two by irido-cyclitis followed by sympathetic ophthalmia.

The patients are usually discharged at the end of the second week with an average visual acuteness of $\frac{20}{70}$, which for a few months may somewhat increase, but then gradually sinks, not only after this mode of operation, but after all others, except when the lens has been removed in its capsule, or, in a certain number of cases, when a piece of the anterior capsule has been removed.

In order to obtain permanently good vision I have for years made a secondary discision of the capsule, which I consider, now as much as before, an integral step, the final act, of the operation in most cases. The discision can be done as soon as the wound is firmly healed, or any time later, best about four, five or six weeks after the operation. It is best done with a knife needle, so shaped that no aquous escapes and the capsule is cut, not torn. Thus far I have not lost or even damaged an eye by this operation. In ten cases glaucoma developed after it, which in the milder cases was cured by pylocarpine, in the severer ones, by an iridectomy with a blunt hook. The secondary discision is a delicate operation, requiring good instruments, perfect artificial illumination and careful examination of the condition of the pupil. Pulling persistent cords to and fro and deep ploughing of the vitreous should be avoided.

The *results* sum up as follows: Last series 346, uncomplicated cataracts 301, failures 4; complicated cataracts 45, failures 7. Arranged according to the usual manner, there were 84% good, 13 moderate results, and 3% of failure (to which two eyes lost by sympathy have to be added), adding to this the more favorable results of the first series of 300 cases 94% good, 5% moderate, 1% failure, we obtain 89% good, 9% moderate results, and 2% of failure.

DISCUSSION.

Dr. Chisolm:—We are so accustomed to look to Dr. Knapp for good suggestions that the profession and the interested public can congratulate themselves upon the decided relaxation in the restraint which he reports himself as practicing since 1891. We all know how essential he formerly considered the absolutely passive state of his patient, in the treatment of his cataract extractions, to the end of the first week. We now find that he allows his patients to walk away from the operating table to their rooms with both eyes unbandaged, that he applies light dressings after 20 minutes to the eye operated upon; exposes the unoperated eye on the second day. This is an immense progressive step over his former practice. I think he will go on improving in this direction until he allows much more latitude in the privileges which he will allow his cataract extractions.

In his statement—that of a skilled operator—he has had in the past 257 simple extractions 19 cases of iritic hernia.

As is well known for the past 5 years, in at least 500 cases of cataract extraction, I have demanded but little restraint on the part of my patients. They walk from the operating chair to their rooms with the operated eye closed with a diaphanous isinglass plaster, the other eye being left open for continual use. I have had no cause for increasing the restraint. My final results are well up with the published reports of others.

In the past year's work in cases of simple extraction, my prolapses, with all the privileges which I give my patients, is 9%, only 2% more than Dr. Schweiger has with the total absence of movement which he demands for the first week of after-treatment. In the last few years there has been a decided tendency to relax the rigid after-treatment, and experience has taught operators that the comfort of the patient and the safety of the eye operated upon seemed to be *pari passu* with the degree of freedom from restraint which the patient enjoys.

Dr. Eugiene Smith :—I do not object to small portions of cortex—would rather leave a small bit than make continued attempts at removals. I consider an iridectomy before or at operation as severe a traumatism as if made subsequent to a simple extraction in case of prolapse. The iris is more tolerant of manipulation (gentle of course) than generally believed. I do not hesitate to push it back with spatula 2, 3 or 4 times if necessary, and even drop a solution of eserine or pylocarpine directly on the prolapsed iris before replacing. My dressing is of the same character as Dr. Knapp's. I permit patients to walk around or sit up or lie down as they please, in an ordinary light room—not confining them as we were inclined to do some time since.

The capsule forceps I use in every case, and find that, while in a majority of cases I extract a portion of the capsule, in case a bit of capsule is not extracted, the forceps act beautifully as a cystotome. I do not find a larger percentage of simple iritis than by simple cystotomy, and do not find posterior synichia more frequently or think that it is more causative of subsequent trouble after the extraction of the anterior capsule with my forceps or any other forceps. My forceps which I show you are only a modification of Knapp's.

Dr. Noyes (on Dr. Erwin's Paper*):—It is important to carefully diagnosticate the variety of cataract before advocating that any line of medical treatment is efficacious in delaying the progress of the opacity. In other words, certain varieties of cataract may remain unchanged for years and galvanism, etc., have no effect. As to curing cataract by medication this is to be noted, that it is often true that vision at the outset of cataract will be worse than it will be found after 3 or 6 months, because the inception of the condition is attended by other intra-ocular lesions, viz: hazy vitreous, lens swelling, ciliary hyperemia, etc. These conditions declining vision improves despite the persistency of the lens opacities.

On the other hand I often prescribe tonics for such patients. I tell them to be careful of their eyes and I endeavor to aid their sight by improving their general health. In this I often succeed. Under such means without local methods, such as galvanism or massage, or tincture of iodine, the vision improves, but almost never does the lens opacity grow less. These observations have been made during many years and are the result of careful study. (On Dr. Knapp's paper) In cataract extraction I prefer the simple method and think that the surgeon who performs an iridectomy must give a reason for his operation. The incision should be ½ *mm.* above the horizontal meridian of the cornea and pass through the limbus Capsulotomy is performed by lacerating the capsule in the centre. Discision, if it become necessary, is deferred for 3 months. I desire to emphasize the danger which surrounds this operation. In some cases I prefer to pass the discision instrument through the sclera and thus reach the capsule.

Washing out the anterior chamber and the use of myotics immediately after the operation I have abandoned. On the first day atropine is frequently used. A bandage is lightly applied over a small pad of aseptic cotton which may be wetted. Pressure is avoided because this favors prolapse of the iris.

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* Abstract of this paper not yet received.—Editor.

This accident is usually trumatic, i. e it is caused by straining efforts on the part of the patient; spasmodic pressure of the orbicularis, the act of winking under the bandage, and finally striking the eye with the hand or otherwise.

DR. RANDALL :—I have, with Dr. Risley, studied a series of cases where declining vision, visibly advancing lenticular opacity, vitreous and choroidal disturbances and increasing swelling of the lens indicated rapidly progressing cataract. Medical treatment limited, stayed or reversed the deleterious process and improved and maintained the vision for at least a term of years.

DR. RISLEY :—Dr. Erwin has laid himself open to criticism in failing to report his cases more fully. The accompanying condition of the choroid and vitreous should have been carefully recorded. As stated, his remarks would seem to indicate the cure of the opacity which never takes place. The improvement in vision is due to clearing of the vitreous and an improved condition of the choroid. I, too, have seen many cases of peripheric opacity remain in same condition for many years, as suggested by Dr. Noyes.

I have claimed in a paper read before the section last year that cataract was not necessarily a senile change, but that the opacities of the lens in 100 carefully studied cases had been associated with nutritional changes in the eye-ball, that the pathological conditions had been improved under treatment and in a large group the onward progress of the cataract had been arrested. Many of these have been watched for a long series of years. Another important advantage of this view of the etiology of lens opacity is this: that while the opacification may not be relieved and extraction therefore become necessary, the eye, by virtue of the treatment, will be better prepared to undergo safely the trials incident to operative interference.

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THE DETROIT MEETING OF THE A. M. A.

To say that the meeting of the A. M. A. at Detroit was *one* of the best is no exageration. Looking at it from any one of the many stand-points from which it may be viewed much can be said in praise.

The committee of arrangements did their work well. The entertainments they provided were greatly enjoyed by all who attended them. The halls for Section meetings were chosen with comfort and convenience in view. We heard no complaints as to the work of the committee of arrangements, except that they were not able to furnish hotel accommodations to all who attended. To find, in a city of 250,000 inhabitants, so few hotels was a matter of great surprise to the many in attendance at this meeting. The Detroit committee, following the example first set by the Nashville committee two years ago, provided well for the entertainment of the wives and daughters of visiting members of the association, while the latter were engaged in either the general or sectional meetings.

By action of the Association an executive committee was created, to consist of three members from every one of the eleven existing Sections of the Association. These representatives of the Sections are to be ex-chairmen of same and are to serve on the committee three years. The term of service of one expires every year, when he is to be succeeded by the retiring chairman. This executive committee must hold daily sessions for the consideration of all matters of business referred to them by the Association. At the next meeting of the Association an attempt will be made to have the executive committee assume the functions of the nominating committee.

On the second day of the meeting quite a breeze was created by the report that the Judicial Council had decided that Dr. W. W. Potter, of Buffalo, N. Y., was not eligible to membership in the Association and therefore was not entitled to the official position to which he was elected one year ago, the decision being based on the fact that the doctor is a member of the N. Y. State Medical Society which is not in accord with the A. M· A., on the code question. This breeze, a little later, blew some resolutions before the Association which were acted on favorably, and are as follows: 1st. A motion was made that a committee of five be appointed by the President, to meet similar committees from the N. Y. State Medical Society and the N. Y. State Medical Association for the purpose of bringing into harmony the two N. Y. organizations on a basis that would render the whole profession in N. Y. again eligible to membership in the A. M. A.

2nd. Another motion, growing out of the first one, was passed that a committee of five be appointed on "Revision of the Code of Ethics."

The vote passing the above resolutions was unanimous. In commenting on this the Editor of the Journal of the A. M. A. says, in the issue of June 18th, "While councils of conservative moderation will no doubt prevail, the desire and disposition of the members to place themselves and the Association in accord with the more liberal thought of the day, will find definite expression in the report of this important committee." Thus it will be seen that a revolution, attempted ten years ago, is being set in motion again under more favorable auspicies. There can scarcely be any doubt that the committee to revise the Code will incorporate some of the "New Code" ideas in their report: there may be some doubt about the adoption of these ideas by the Association, since it takes so large a majority to effect changes in this venerable document. Because of the agitation of the Code question it may be predicted that the next two annual meetings will be the largest and the loudest of any ever held before.

◆

THE SECTION OF OPHTHALMOLOGY A. M. A.

The meetings of this Section at Detroit were better attended than ever before, fully one-hundred being present at the first session. The attendance continued good to the very close on the fourth day. Thirty-three of the forty seven who had promised papers for this meeting were present and read. A few of the absent ones sent their papers which were read in abstract and referred to the committee on publication The papers all showed thought in preparation and were listened to attentively. Because of the great number of papers to be read the discussions were not as numerous and lengthy as they other wise would have been.

In this editorial it might appear invidious to make special reference to any one or several of the papers that were read. We are able in this issue to present abstracts of some of the papers and the discussions that followed them. The author of every paper read has been asked for an abstract of his paper.

The meeting was a very pleasant one, and a very profitable one from a scientific stand-point. Dr. J. L. Thompson, Chairman, made a prompt and efficient presiding officer. His rulings on all questions were correct and done in kindness. When, on the third day of the session, a telegram was handed him calling him to the bed-side of a sick daughter, the hearts of all present were pained and resolutions of sympathy were adopted. Dr. Risley, the newly elected chairman, presided, during the remainder of the meeting, kindly and efficiently. Dr. de Schweinitz, Secretary, who had labored so hard to get papers, tried earnestly, but not very effectively, to get every one who discussed any paper to write out his discussion fully. The first and second days he met with fair success in this direction, but on the third and fourth days he failed almost completely to get any one to write out what he may have said.

The Secretary kindly allowed the editor of the *Record* to have a typewritten copy made of all the discussions which had been handed him, and it is because of this kindness that we are able to present, in this issue, some of the good work done during the session. In subsequent issues a publication of the scientific proceedings of the Section will be continued to completion.

THE SECTION DINNER.

On Wednesday evening, June 8, the Section of Ophthalmology indulged in their first annual dinner, at the Cadillac Hotel, Detroit. Fully 100 members and a goodly number of ladies occupied seats around the U shaped table, and enjoyed the good things provided. Chairman Thompson was master of ceremonies. In announcing the toasts his usual good sense and humor were displayed. Dr. Dudley Reynolds responded briefly but elegantly, to the toast—"the ladies;" Dr. Leartus Cormor, to the toast "the Section of Ophthalmology." Drs. H. Knapp and H. D. Noyes, of New York, were called on for a speach and each responded entertainingly, after which the banquet hall was deserted. The Section will enjoy its second dinner at Milwaukee next year.

DR. S. D. RISLEY AND DR. H. GRADLE.

They are the officers of the Section of Ophthalmology, A. M. A., for the coming year. They will not only keep alive the present interest in the Section but will be able to add to it largely, because of their native industry and energy. Chairman Risley's address is Philadelphia, Pa., and that of Secretary Gradle, Chicago, Ill.

VOLUME II OF THE OPHTHALMIC RECORD.

With this issue volume II begins. The success of the past year gives hope for the future. Many have been the kind and encouraging words spoken and written to the Editors. We have had a deluge of them since the last number of Vol. I was sent out. All these things we appreciate to the fullest; and appropriate them as a stimulus to further effort in the direction of furnishing to our readers the best matter and an abundance of it. We promise 40 pages of reading matter in each issue of the current volume, and that, too, without additional cost to our subscribers. Our subscription list is growing but we will not be satisfied until every reputable oculist in the U. S. and Canada becomes a reader of *the Record*. For the accomplishment of this end we know we must depend largely on the kind words to be spoken to non-subscribers by our large number of supporters.

SAMPLE COPIES AGAIN.

It is not the policy of *The Record* to send sample copies unless asked for; but we again feel inclined to vary from this rule and send out a few hundred sample copies of this issue to a select number of non-subscribers, with the hope that, being reminded of the continued existence—even prosperity—of *The Record*, they will be led to add their names to our subscription list. In each sample copy will be found a subscription blank. Copies of every issue of Vol. I, except No. 1, can be furnished if desired. Most of our new subscribers go as far back into Vol. I as they can. While we want your support, we propose giving you more than value received.

AN ACT FOR THE PREVENTION OF BLINDNESS.

The legislature of the state of Rhode Island has recently passed the above named Act. It provides that every midwife or nurse who observes inflammation or redness of the eyes of infants under the age of two weeks shall report same at once to the health officer or some qualified practitioner of medicine in the city or town in which the parents reside. The second section of the law requires that the health officer shall furnish a printed copy of the act to every midwife or nurse known to him, which copies must be furnished him by the secretary of state. The third section provides that all persons not complying with this act shall be fined not more than $100.00, or be imprisoned not longer than 6 months, or both.

This is a good law and should be enacted by every state. It is through the kindness of Dr. F. T. Rogers, Providence, R. I., that we are enabled to furnish the above information.

DISEASES OF THE EYE.

A hand-book of Ophthalmic Practice for students and practititioners
By G. E. deSCHWEINITZ, M.D.,
Professor of Diseases of the Eye in the Philadelphia Polyclinic;
Lecturer on Medical Ophthalmoscopy in the University
of Pennsylvania, etc.

American authors are taking a commanding position in the field of ophthalmic science. The latest work on the diseases of the eye is from the pen of Dr. de Schweinitz, of Philadelphia, who associated with himself Drs. James Wallace and Edward Jackson of that city. The several divisions of the book are methodically and systematically arranged. The first and fourth chapters were written by Dr. Wallace; also that portion of chapter third which relates to reflection, the ophthalmoscope and its theory, and the examination of the direct and indirect methods; and that part of chapter nineteen which describes the mechanism of diplopia, the rotation of the eye-ball around the visual line, and the causes of concomitant convergent and divergent squint.

Dr. Jackson wrote the section on Retinoscopy. Both Dr. Wallace and Dr. Jackson have shown a clear understanding of the subjects about which they have written. The whole book is interesting and may be studied with profit by all students of ophthalmology. The book contains over six-hundred pages, and is illustrated by two-hundred and sixteen cuts, and two chromo-lithographic plates. The index is well arranged which makes the book a good one for ready reference.

The publisher, W. B. Sanders, of Philadelphia, has done his work well. We heartily commend the book to all who read this notice.

Department of Otology, Laryngology and Rhinology.

GEO. H. PRICE, M. D., EDITOR, 621½ Church Street,
NASHVILLE, TENN.

SCIENTIFIC PROCEEDINGS OF THE Section of Laryngology and Otology of the A. M. A., at the Detroit Meeting, June, 1892.

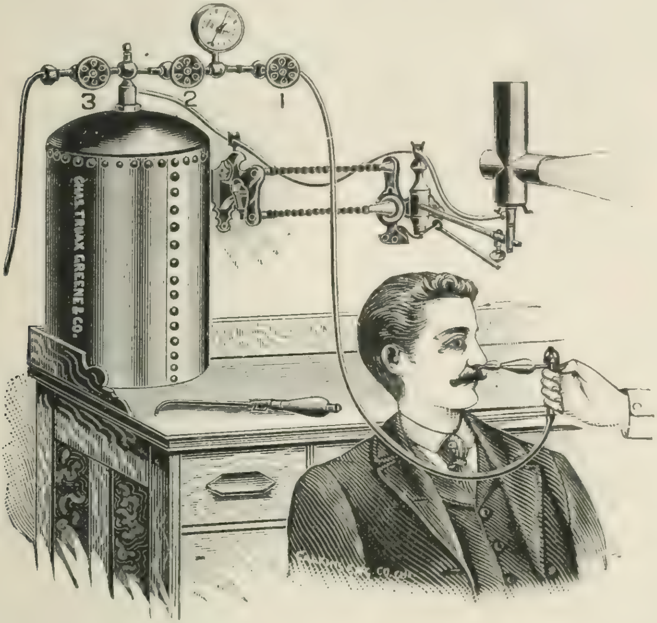
ABSTRACT OF A PAPER ON "COMPRESSED AIR AND SPRAYS IN DISEASES OF THE NOSE, THROAT AND EAR,"

BY S. S. BISHOP, M.D., CHICAGO, ILL.

Dr. Seth Scott Bishop, of Chicago gave the results of a series of experiments to determine the various amounts of air pressure necessary for effective treatment of the ear, throat and nose.

He found that the rubber air bags in common use by Americans, exert a pressure of from six to fifteen pounds. While these afford sufficient pressure for spraying the nose and throat with hand atomizers, which do not require more than from eight to twelve pounds, they do not provide enough force for treating certain conditions of the middle ear, the dosage for which, in some cases, amounts to sixty or eighty pounds, or more.

In order to adapt the improved compressed air apparatus to the safe treatment of the latter class, Dr. Bishop has contrived an air meter which places the volume of air and height of pressure within the knowledge and control of the operator.



This air meter consists of an air pressure gauge placed between two valves in the escape pipe of the air reservoir. While it serves the purpose of indicating the whole number of pounds pressure in the reservoir, it also shows the height of pressure of the column of air that is escaping through the cut-off at the end of the treatment tube. One valve governs the volume of air used while the other determines the amount of pressure.

This device places the use of the high pressure apparatus on a scientific basis. All guess work is eliminated. A definite dosage of compressed air is made possible. Interrupted currents can be propelled into the middle ears with as high pressure as seventy or eighty pounds, with the volume diminished in inverse ratio, with safety. But without this meter to guide in proportioning the volume to the density, the high pressure apparatus would not be safely available for ear treatment.

Dr. Bishop gave a detailed discription of the air meter and directions for its use in projecting camphor-menthol and liquid lavoline and other sprays into the Eustachian tubes and middle ears. By this method, not only is the air filtered, but the tubes and middle ears are medicated. With these controlling valves he has employed as high as ninety pounds pressure in certain chronic affections of the ears without any ill effects, and no case of rupture of the drum head has ever resulted. Thus the ear is rendered nearly as accessible to treatment with the various volatilized medicaments and sprays as the nose and throat.

It is evident that an instrument that affords safe treatment with such high pressures can accomplish results that are impossible by means of rubber bags that furnish, at most, not more than one atmospheric pressure, or about fifteen pounds. But it should always be remembered that with a high pressure a small volume of air must be used. The following rule is proposed by Dr. Bishop to keep the operator within the limits of safety. The higher the pressure the lower the volume should be.

Another point worth remembering is that the pressure used in such cases as have atrophied soft palates should not be strong enough to strain them, especially if they are subject to attacks of rheumatic sore throat.

Dr. Bishop has adapted the Buttle's inflators to be operated by the improved compressed air apparatus, with the result of making the use of the Eustachian catheter unnecessary in the majority of treatments. With these inflators containing medicated sponges and fitted with the nasal tip, the ears can be inflated and medicated on the principle of Politzerization when the rubber baloon would fail. Consequently we may avoid the risk of irritating the nose and throat and conveying infectious germs by the catheter.

The same medicated inflator is fitted with a catheter tip to inject lavoline sprays into the middle ears through the catheter when required.

ABSTRACT OF A PAPER ON

"SPONTANEOUS CURE OF MULTIPLE PAPILLOMATA OF THE LARYNX AFTER TRACHEOTOMY,"

By JOSEPH A. WHITE, A.M., M.D.,
Senior Surgeon to the Richmond, Va., Eye, Ear, Throat and
Nose Infirmary.

Dr. W. reported a case of cure of recurring papillomata of the larynx after tracheotomy in a boy 11 years old who was operated on in June, 1887. He had previously removed the growth per vias naturales several times with a more pronounced recurrence each time An attack of suffocation, which brought the child to death's door necessitated the tracheotomy. Any subsequent attempt to remove the growths resulted in increasing the neoplasm. When all operative efforts ceased, they began to disappear spontaneously, and the case is now well. The tube has been worn five years. The voice is perfect and health good. An interesting point of the case was the development of a well marked isolated papilloma on the under side of the epiglottis. The case also developed tracheal papillomata after the operation which had delayed the removal of the tube. Dr. White was advised, but declined to do thyrotomy, because of the prospective injury to the voice.

It is the *sixth case* in laryngological literature of spontaneous cure of these growths after tracheotomy, the others being reported as follows:—two by Prof. Oertel, quoted by Hoppmann; one by G. Hunter Mackenzie; one by Eliasberg which closely resembled the authors' case, and one by Garel.

It is also the only case of papilloma of the epiglottis except the one reported by Uchermann.

Dr. White argued that tracheotomy was preferable to thyrotomy, because it was equally free from danger to life and did not injure the voice.

He also made some remarks on the causation of laryngeal papillomata in children, and called attention to their connection with adenoids of the naso-pharynx.

ABSTRACT OF A PAPER ON

"THE OPERATION FOR EXCISION OF THE OSSICULA IN CHRONIC AURAL CATARRH WITH INSTANCE OF A FAILURE,"

By H. V. Würdemann, M.D.,

Milwaukee, Wis.

The author disclaims any intention of maligning surgical procedures in aural disease as he is convinced of their utility by his own experience. No cases hitherto have come to his knowledge in which the hearing had been made worse by excision of the larger ossicle.

The patient was a strong healthy man of 60 who complained of increasing deafness, tinnitus and vertigo. He claimed right ear to have discharged many years ago and since that time had been totally deaf on that side. The left ear had been failing for about five years and conversation was now carried on with difficulty. The patient could hear tuning fork of low pitch and the bone conduction was relatively better on the right or deafer side: loud sounds also heard. On the left side he could hear the watch by pressure, whisper 2 cm and voice, 1½ m. Drumheads retracted and opaque with chalky deposit in membrane. Eustachian tubes of both sides patulous. Has hypertrophic rhinitis and deviated septum.

The nasal trouble was greatly benefited by treatment, but after four weeks treatment by vapors and injections through the catheter he was no better as to the tinnitus or hearing. The probable benefits of the operation of excision were held out to the patient, and the operation done under ether. The malleus and membrane were extracted without difficulty and although several attempts were made to bring the incus into view by the incus hook, no reckless gouging was done. The patient did not take the anæsthetic well and became cyanotic at times, delaying the progress of the operation. On the next day he was found *to be totally deaf on the operated side* and complained of great dizziness. The latter was ascribed to the after effects of the ether. A few days later suppuration set in which stopped in two weeks. The after treatment for the first few days consisted "in letting bad enough alone" and afterwards in gentle removal of the discharge by a pledget and boric acid solution.

In spite of subsequent treatment by pilocarpin, mercurials, electricity and local treatment through the catheter the patient has continued practically stone deaf to the time of writing, one year to the date of the operation. Treatment was continued on the other side with beneficial results, to the gratification of all parties concerned. Massage of the drumhead and moblization of the ossicles by cotton tipped probe applied directly to the malleus, combined by the use of Siegel's otoscope and the catheter, were the principal therapeutic means to which the improvement could be ascribed.

This is the first case happening in the author's practice in which suppuration occurred after the operation, although this is a common occurrence as reported by others.

He thinks that the lesion in the case was a hemorrhage into the labyrinth occurring during the progress of the anæsthetic. He concludes that the lesson of this case is that our prognosis must be more guarded in the future as to the results of excision of the ossicles and drumhead in chronic aural catarrh and that patients of the age of this one are unfavorable cases for operation.

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THE

OPHTHALMIC RECORD.

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Continuation of the SCIENTIFIC PROCEEDINGS OF THE SECTION OF OPHTHALMOLOGY OF THE A. M. A., At Detroit, Mich., June, 1892.

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DISCUSSION OF DR. KNAPP'S PAPER* CONTINUED.

Dr. L. Webster Fox:—I wish to bring to the notice of the members present, five specimens of black cataracts taken from three patients. No. 1 was removed from the left eye of a female May 11th, 1890. The patient gave a history of blindness for 14 years, and previous to this always had defective vision owing to an existing high myopia. In this operation I performed an iridectomy, and followed by rupturing the capsule and delivering the lens with a slight loss of vitreous, owing to greater pressure being required to force out the lens which was of unusual size. The wound healed rapidly and with a sph + 6. ⊂ cyl + 2. ax. 35°, vision equaled $\frac{20}{100}$.

She had also a very high degree of convergent strabismus. On June 27th, I performed a double tenotomy with an excellent result, both eyes becoming straight.

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*See No. 1, Vol. II, p. 26.

By December (1890), the capsule in the operated eye became so dense that vision fell to about $\frac{1}{10}$th. Having had no inflammatory reaction after the first operation, but fearing danger from a capsulotomy on account of the fluidity of the vitreous, I obtained consent to remove the cataract in the right eye which was done December 7th. Remembering that I had to deal with a cataract of extraordinary size I made an extra large flap and a large iridectomy. The lens was removed with its capsule. The eyes progressed favorably and on December 30th, I found that the following formula gave $\frac{20}{70}$ vision: cyl. + 6 ax. 180° ⊂ cyl. — 3. ax. 90°. To this a sph. + 3. added gave useful reading.

The above glasses were worn until June 21, 1891, when another test was made on account of a certain loss in visual acuity. This formula was as follows sph. — 1. ⊂ cyl + 6. ax. 5° and gave two letters of $\frac{20}{30}$, and with an extra front glass of sph. + 2 J. $\frac{8}{10}$. The patient was subjected to an examination on April 10th, 1892, and no change found in visual acuity, it remaining the same as found in 1891. No change in the thickened capsule of the left eye. After the second operation erythropsia developed which continued for six months, when it gradually disappeared and the vision has since remained normal to light sensation.

Case 2. Male 61 years, was first examined January 11, 1891. The right eye-ball was removed early in life by a physician in Boston on account of dropsy of the eye-ball. The left eye was always myopic to a high degree, but the patient was able to follow his occupation, book-binder, until April 13, 1880, when he suddenly went blind. He could not give a clear history of the cause, other than the fact that the sight grew bad and the cause was attributed to a cataract.

On January 16, 1891, I made an examination and found an unusually large eye-ball and a black cataract: good projection of light. His family history was irrelevant and being encouraged by success in the prior case, I suggested an operation which was performed January 25th, without iridectomy. I experienced some difficulty in tearing the capsule, but delivered the lens with some loss of vitreous which was highly fluid. The movement of the hand could be readily seen by the patient immediately after the operation.

During the night of the third day, a sudden discharge of phosphenes took place which so alarmed the patient that he suddenly sprang from his bed and it was with difficulty that his nurse could persuade him to lie down. An opiate was given him for in a short time the pain in the eye-ball became very great. I examined the eye early the following morning and from the extreme hardness of the ball, great pain and complete loss of vision, I was sure that an intraocular hemorrhage had taken place. Antiphlogistic remedies were promptly resorted to but the eye went from bad to worse, and to relieve the intense suffering the eye-ball was removed. Upon examining it I found complete detachment of the retina and the eye-ball filled with blood-clot.

Case 3. Female age 61. A history of failing sight for over five years. The examination revealed double black cataracts with good light projection in both eyes. Never could discern objects at a distance, always near-sighted, other than this eyes were apparently excellent. On June 21, 1891, the cataract was removed (iridectomy) without complication and the eye progressed favorably. Six weeks after the operation my assistant was hastily summoned to see the case on account of an iridocyclitis which ultimately led to loss of vision and ended in a partial atrophy of the eye-ball.

On November 8th, I performed an operation on the right eye. This operation was followed by permanent useful vision. This was the simple method and the lens removed in its capsule. I have not given the full details of these cases as I wish to have the lenses examined by some competent chemist to see whether he can find out the causes which produce the discoloration, etc. On account of the rarity of such cases I feel that these specimens may be interesting.

ABSTRACT OF A PAPER ON "IMMATURE CATARACT AND THE BEST METHOD OF HASTENING MATURITY,"

By JOSEPH A. WHITE, A.M., M.D.,

Senior Surgeon to the Richmond, (Va.) Eye, Ear, Throat and Nose Infirmary.

RICHMOND, VA.

Dr. White, in this paper, presents his experience with a comparatively little used method of ripening cataract, seemingly done only by himself, and which he calls "the method of paracentesis and external massage." He considers the five other modes of ripening cataract, viz:

1st, Simple division of anterior capsule.

2nd, Division combined with iridectomy.

3rd, Division and external massage.

4th, Iridectomy and external massage (Foerster's operation).

5th, Internal massage directly on the anterior capsule.

He argues that the method he follows is free from all the dangers attending the others, and equally efficacious. In the fifteen cases operated on none had any unpleasant sequelæ, and the cataract in each ripened rapidly, the shortest time being two days, and the longest two weeks. Its advantages are, that the cortical masses are opacified, freed from the capsule, and more easily delivered in the subsequent extractions.

The time for the operation is when the patient can no longer read, although some of his cases had V. — $\frac{20}{200}$. Contra-indications are insufficient dilatation of the pupil under atropine and a weak zonula.

The operation is done by drawing off the aqueous thoroughly after a maximum dilatation of the pupil, and then rubbing the cornea up and down, from side to side, and round about with sufficient force to crush the cortical masses. It is especially valuable in slow developing cataracts in persons under 60 years of age, and it obviates the necessity of removing such cataracts when immature, a proceeding always attended with more or less risk. It also does away to some extent with the necessity of irrigation of the anterior chamber, as the toilet of the eye is much easier in the cataracts thus ripened, the cortex being less sticky, and readily delivered. He considers irrigation a hazardous addition to the operation of extraction, and to be avoided if possible.

He reports in detail his last two cases, as also two by Dr. Dunn, Chief of Clinic at the Eye Infimary (Richmond, Va.), to show the results of the operations. The subsequent extractions were done without iridectomy and with either a peripheral capsulotomy, or removal of the anterior capsule.

DISCUSSION.

DR. CHISOLM:—I thank Dr. White for his very interesting paper and valuable suggestions. For many years I have ripened immature cataracts by needling the lens and have seen no trouble come from it The only annoyance was in the delay of the ripening; should the capsule opening be made too small, the lens changes are very tedious and repetition of the puncture is necessary. To hasten the restoration to useful vision in old persons, is a much to be desired object. I see annually so many persons made miserable by being debarred their daily occupation through an advancing lens clouding which makes annoyingly slow progress, any method which will put the lens in condition for a speedy extraction, and by so doing enable the patient to escape months of annoyance, is most valuable. I for one shall put it immediately to the test, and hope to obtain the excellent results that have followed the massage treatment at the hands of Dr. White.

DR MINNEY:—The only criticism I would make on the Dr's paper is, it was unnecessary risk, after doing the operation for ripening the cataract, in permitting his patient to take in the town the same day.

DR. HOTZ practiced artificial ripening in 1885 and 1886 in all suitable cases; he followed Foerster's method first, but finding often unpleasant, and sometimes very violent, reaction, he modified the operation in the same way as Dr· White did, evacuating the aqueous and applying massage through the cornea. But this method proved as uncertain in its result and as dangerous in its effect in some cases, as the other method: it made no impression on the lens in some cases and was followed by unpleasant reaction in others. In one case the first massage produced no change in the lens at all, and the same operation repeated three months later was followed by irido-cyclitis resulting in permanent opacity of the cornea. This experience made the doctor very reluctant to further attempt maturing cataracts, and he rather extracts a cataract which may not be fully mature than to take any chances on a preliminary ripening. The amount of transparent lens matter which remains after removing the nucleus and the bulk of the cortex is usually too small to create any disturbance by its subsequent swelling, and should it create any disturbance it could easily be removed by reopening the chamber.

Dr. Tilley expressed his views in favor of the conservative method advocated by Dr. Hotz. He further advocates the use of physilogical salt solution as a wash for the anterior chamber and capsule of lens. Prof. Welch, of Johns Hopkins Hospital, has shown that the said salt solution is practically the only solution which can be used without danger to the epithelia of the tissue with which it comes in contact.

Dr. Prince:—My experience, and the observation of the Illinois Charitable Eye and Ear Infirmary, lead me to give in my testimony in favor of direct trituration after iridectomy. I am of the opinion that by introducing a proper sterilized instrument into the aqueous chamber following an iridectomy and gently triturating the capsule, the danger of iritis will be avoided in great part, and the eye brought into a most favorable condition to facilitate the subsequent extraction.

Dr. Baker, of Cleveland, Ohio: Five or six years ago I operated upon three cases by the method detailed by the author of the paper. The reaction was so intense that I, like Dr. Hotz, have not felt justified in continuing the operation, and have returned to the preliminary iridectomy and subsequent extraction with peripheral capsulotomy, using care to remove all cortical substance from line of incision and permitting the remainder to absorb. It seems to me this is a much safer course to pursue in these cases.

Dr. White, in closing discussion on his paper: I am very glad to find that others have tried the method of ripening cataracts, suggested in my paper. As in all other surgical operations, opinions differ as to the value and efficiency, and different operators have different results. This may be attributable to the fact that the same exact method, the rules of guidance are not followed in performing the operation. In cataract extraction, whether to lack of observance of the same precaution, or to less dexterity, all surgeons do not have the same results. I regret that the gentlemen who have given this method of ripening cataract a trial have had at times unfortunate sequelæ. I have, I am happy to say, none. Whether this was due to a better selection of cases or to blind chance, I am unable to say. The results in 15 cases of my own and two of Dr. John Dunn, were as satisfactory as could be desired. I do not hesitate to recommend the operation to any of my personal friends as worthy of trial, because of my gratifying experience. One rule has, however, to be rigidly followed: never operate on a case when the pupil cannot be dilated add maximum, without difficulty by any mydriatic. If the iris is engorged or rigid, massage would be followed, in all probability, by iritis: and that may account for the bad results reported by my colleagues. Moreover the tension must be normal and the Zonula intact. In doing the operation the aqueous must be thoroughly evacuated and the massage graduated, not too light or no result will be achieved, not to violent or excessive irritation will be set up. This is a matter of practice. Of one thing I am satisfied, a careful and conservative trial of the operation will give it a permanent place in Opthalmology.

ABSTRACT OF A PAPER ON "INFANTILE CATARACT."

By A. R. BAKER, M.D.,
Cleveland, Ohio.

He called attention to the necessity of having a more uniform classification of cataracts, and called attention to the statement made by Mr. M. C. Macnamara: "Microscopical specimens have demonstrated the fact that some of these Zonular Cataracts consisted of a film of connective tissue, together with remains of the hyaloid artery."

He also expressed the opinion that anterior polar cataracts were nearly always due to a perforation, or at least inflammation, of the cornea.

In conclusion he offered the following.

First. Infantile cataracts should be operated upon early—within the first year if possible.

Second. In Pyramidal and Zonular cataracts, in which vision cannot be improved to $\frac{20}{50}$, after fully dilating the pupil, removal of the lens is to be preferred to iridectomy

Third. Fluid cataracts are best removed at once by linear extraction.

Fourth. Soft cataracts including Zonular and Capsular are best treated by first breaking up the lens thoroughly and removing a few days later, by the combined linear extraction and suction operation.

Fifth. Simple discission is sufficient in very many young infants unless nystagmus should be present.

Sixth. Only one eye should be operated on at a time.

Seventh. There are a few cases in which it may be advisable to extract one lens for distant vision, and make an iridectomy on the other eye so that a certain amount of accommodation may be preserved for near work.

ABSTRACT OF A PAPER ON

"INJURY OF THE LENS, WITH CASES,"

By B. L. MILLIKIN, M.D.,

Cleveland, Ohio.

From a clinical standpoint injuries of the lens may be divided into two classes.

1st. Those where the chief injury is to the lens mass itself, and 2nd, where there is, in addition, a grave lesion of other structures of the eye-ball, the latter comprising a much larger proportion of all cases with which we meet.

In the first class are comprised such injuries as bits of steel or iron lodging in the lens substance, spicules of iron penetrating the cornea and lens, but not remaining, etc., these producing very different lesions, depending upon their size, form and the force with which they enter the eye. If these penetrate the lens and enter the vitreous, another complication arises, depending upon the ultimate lodgement of the foreign body.

The second class comprises a series of injuries of great importance and variety, depending entirely upon the structures involved, the most serious being those associated with injuries to the ciliary body, and the results will depend materially upon whether the foreign body remains in the eye or not. Also the age of the patient affects directly the outcome of all injuries. Most injuries of the lens are liable to terminate in traumatic cataract, more or less complete, depending upon the extent of the lesion to the lens or capsule. In the early history of injuries, the diagnosis is usually not difficult, and by dilating the pupil with cocaine or homatropine, a good view of the lens can be secured either with the ophthalmoscope or by oblique illumination. But with injuries of the iris and ciliary body in addition, the location is difficult or impossible, on account of the hemorrhage and other disturbances

Within a day or two the line of opacity through the lens will suffice to show readily the course of the penetrating body.

The rapidity of the development of traumatic cataract will depend upon the extent of the lesion of the lens, and especially of the capsule. Very frequently opaque portions of the lens change rapidly and considerable areas will be absorbed in a very short time. Sometimes a line of opacity will disappear entirely, leaving the lens matter quite clear: while again, such a line will remain for years, marking the course of a penetrating body, and if near the periphery will not interfere with vision.

Six cases are cited as illustrating the variety and progress of the various classes of cases.

Case I. Spicule of iron penetrating the cornea, iris and lens, showing within a few days an opaque line, at the point of entrance to lens, which shortly cleared completely, leaving no trace of injury, normal vision remaining.

Case II. Fragment of musket cap penetrating cornea, iris and lens, lodging in vitreous chamber and leaving, after twenty years, an opaque line through body of lens, and useful vision

Case III. Explosion of powder in face, grain penetrating cornea and injuring capsule and lens, followed by opacity of lens over considerable area which ultimately cleared, leaving an opaque spot on lens, and vision nearly normal.

Case IV. Young lady of twenty, struck in right eye by barb of wire fence, producing irregular wound of cornea and capsule of lens, and some escape of lens matter into anterior chamber, and immediate loss of vision. Pupil was kept dilated with atropia, lens matter in anterior chamber rapidly absorbed, and opacity in lens quite extensive like wheel spokes, gradually cleared till she could count fingers at eight feet. Later, vision failed, probably due to re-development of cataract.

Case V. Injuries to both eyes at considerable intervals. Man aged twenty one, struck in left eye by an iron burr which produced lineal wound of cornea, and injury to capsule, lens matter escaping into anterior chamber. By operation, opaque lens material was removed. By second operation later, capsule was slit with favorable result.

A year later, right eye was struck by bit of steel which penetrated corneo-scleral junction at lower outer quadrant, and anterior chamber filled with blood. Three days later, examination with oblique light showed striæ of lens. Evidently traumatic cataract was developing rapidly but painlessly. Month later showed irritation greatly subsided, pupil irregular in shape with attachments in wounded region, middle lens portion clearing, but with more dense opacity directly behind seat of injury. Two weeks later, central lens portion well cleared, and opacity confined to neighborhood of injury. After nine months, sight failed and patient could count fingers at six feet only, cataract subsequently involving almost whole of lens.

Case VI. Man of twenty-five years struck in left eye by small piece of steel. Feeling no pain, and supposing the steel had not entered the eye, he continued working, though unable to see all day. At night, physician could not find a foreign body. Shortly after, opaque lens matter was removed by operation, but patient has been sightless except for bare outlines of objects. Pupil is now fairly clear, and cornea irregularly scarred, iris adherent above, and with ophthalmoscope the deep structures of the eye are invisible owing to dense opacity of the vitreous. Eyes are sensitive, and liable to further trouble, owing to foreign body still present.

Few lens injuries but leave some permanent damage. For the young, a prompt putting the patient in bed, and eye at rest, by bandaging and paralysis of accommodation is of utmost advantage.

The first requisite for both young and old, is removal of offending body when possible, then cleanliness by aseptic or antiseptic washes. Simple boiled water, or solutions of boracic acid and bichloride of mercury 1 to 5000, serve, when freely used, as eye washes.

The great danger and annoyance when the injury involves the iris, is the plastic adhesion of iris to lens Atropia sufficiently strong to thoroughly dilate the pupil, and keep the iris out of harms way, is most valuable. For the young, there is little danger of glaucomatous symptoms. When such occur the increased tension may be avoided by emptying the anterior chamber.

The cataractous condition is doubtless largely due in such cases to abusive use of the organ where it should rest indefinitely.

Bandages need be employed usually, only till external wound is healed, unless hemorrhage requires their moderate pressure. Alternate use of atropia and eserine is efficient in irridic attachment cases.

In old people use of mydriatics must be watched carefully to avoid development of glaucomatous symptoms.

ABSTRACT OF A PAPER ON "MANIFEST AND LATENT HYPEROPIA."

By DR. EDWARD JACKSON, M. D.,
PHILADELPHIA, PA.

Dr Jackson's paper was based on careful measurements of the refraction in 214 cases, before and after the use of a mydriatic. He found that under the age of 20, in only 21% of cases was there any hyperopia latent, and that from this age latent hyperopia became more frequent up to the age of 40 when it was present in 53% of all cases. The proportion of latent hyperopia found was largely dependent on the methods of testing for it.

In view of these facts latentcy of hyperopia must be regarded as inconstant and abnormal.

Lenses ordered without a mydriatic should only correct the manifest H.; and the correction of the total H could alone be regarded as a permanent correction.

DISCUSSION OF DR. JACKSON'S PAPER.

Dr. Würdermann, of Milwaukee:—

The cases of "Latent Hyperopia" as spoken of by Dr. Jackson in which there seems to be a considerable difference between the total and manifest hyperopia, occur as I have found it, about one case in 20, as is shown by the relative reaction of homatropine and atropine. I find that in about 19 cases homatropine unmasks the full amount of hyperopic error, but in the 20th case I have to resort to atropinization.

Dr. Hotz disagrees with essayist in two points:—

First the comparatively small percentage of latent hyperopia in patients under 35 years His experience is, that where manifest H. existed in such persons the suspension of accommodation usually unmasked an additional degree of H. 2nd, as to the degree of latent H. $\frac{3}{4}$ D. which the table shows as the highest degree, is certainly too low. In convergent squint we often find 1.50 to 2.50 D. latent.

Dr. Randall called attention to the fact that just as no one can stand without a muscular effort or tension, just so the hyperopic eye can see clearly only by a ciliary effort Let the muscles be relaxed and the body will tend to fall and the vision to blurr; so the effort becomes habitual, yet the ciliary effort is no more a spasm than the other; either can in strictly similar manner be relaxed by the individual if the need for it is done away with.

Dr. Jas. A. Lidston said in response to Dr. Jackson's statements to the effect that latent hypermetropia is the exception. and not the rule: In my own cases of refractive error it seems to me that we must appreciate fully what the term latent hyperopia implies, and this is to be determined by our particular methods of testing. For example, if we resort to the ophthalmoscope we must fully concur with the doctor when he says "Latent hyperopia is the exception, and not the rule"; but if we resort to the ordinary method of testing without paralysis of the accommodation, then I am convinced by all the cases that have fallen under my observation, and by the experience of all Ophthalmologists that a certain amount of the hyperopia present will be held in abeyance and constitute the so-called latent hyperopia. Again when testing our cases and tabulating our statistics it seems that we are prone to forget that one individual may be suffering with a debilitated condition of the system which reacts upon the accommodative muscle, and this reveals an error which would otherwise be obscured and thus constitute a latent error and in this case be styled latent hyperopia. Then, too, when the Dr. states that the accommodative mechanism is not materially impared till later life, it appears that his experience does not concur wholly in this respect with that of others. Noyes basing his statements upon the admirable table of Donders, states that the accommodative power begins to wane as early as 16 years, and is quite noticably impaired at the age of 30 and still more so at 50, and is almost obliterated at 75 years, so that this would exercise an influence directly opposite to that claimed by the Doctor in rendering manifest otherwise latent case of hyperopia.

ABSTRACT OF A PAPER ON "WHAT MAY BE CONSIDERED NORMAL CORNEAL ASTIGMATISM,"

By H. V. WÜRDEMANN, M.D.,
Milwaukee, Wis.

The author considers the ophthalmometer an essential instrument to the armamentarium of the specialist. It is generally held that this instrument gives nearly the total astigmatism of the eye. Würdemann does not find this to be the case, and thinks that the varying reports on the relation of the corneal to the total measurements may be accounted for by the personal equation of the operator and by his method of examination.

Instead of following the usual instructions for keratometry with the ophthalmometer of Javal and Schiötz (model 1889) by which an error of even 1 D. may be made, he advocates comparison of the black interspaces in approximating the plaques and reading off, on the graduated scale of the arc, the exact refraction of the principal meridians.

In the measurement of all sorts of corneæ on their principal and oblique meridians at 5° intervals from the visual center to the limbus, he finds all corneæ highly astigmatic in their periphery, and that in most cases the curvature diminishes more rapidly in the vertical than in the horizontal meridians. He considers that five degrees on either side of the visual center serves for most purposes of vision and if this erea be free from astigmatic aberration the eye may be called non-astigmatic. The optical portion of the cornea, however, embraces an area of about 17° around the pupillary center (which nearly corresponds with the optic axis). This is ellipsoidal in shape with axis approaching the vertical being limited by the angular aperture of the pupil. This does not accord with the polar zone, which extends from 10° to 20° around the corneal axis. The latter is ellipsoidal with long diameter in direction of general astigmatic axis.

The amount and kind of astigmatism is influenced by the relative position of the visual line to the different parts of the polar zone. Degrees of corneal astigmatism of 3. or 4. D. may be produced by the visual line passing eccentrically through the cornea, and in his opinion is one of the principal factors in its production.

From the records of 300 eyes, of which 63 were emmetropic, 52 simple hyperopic and 8 simple myopic, the rest showing total astigmatism, he finds 93% of the whole number to have corneal astigmatism appreciable by the ophthalmometer. All of the cases where the total equalled the corneal measurements, were found in the latter. All of the emmetropic, hyperopic and myopic eyes had corneal error ranging from a little less than .25 D. to 1.50 D. In adults the corneal astigmatism was usually .50 *D. greater* than the total, when the meridian of greater refraction was *vertical*, and the same amount *less* when *horizontal.* In old people the average difference was .25 D. and in children, .75 D. Most of the cases where the total equalled the corneal error were found in the elderly. This is a general statement, as the amount of astigmatic aberration is modified by the kind of general ametropia and the amount of lenticular decentration. The difference is neutralized by a corresponding lenticular astigmatism *against the rule* which has its origin in the oblique position of the lenticular refraction surfaces to the visual line. The decrease in difference observed in old subjects may perhaps be explained by senile changes in the lens structure increasing its refraction. He considers that a total astigmatism is not fully corrected by cylindrical lenses on account of the irregular or meridional astigmatism which exists in all eyes within a few degrees of the visual axis. He regards that amount of corneal astigmatism as normal which is neutralized by the lenticular error. This irregularity in the corneal refraction may be considered a corrective effort on the part of nature in setting aside a certain amount of lenticular *error*. In the use of the ophthalmometer for glass fitting, he is prepared generally to *subtract* .50 *to* .75 *D.* from its readings when with the rule, in children, and to add the same when *against*. In adults the difference is usually .25 to .50 D. When the meridian of greatest refraction is oblique, the corneal and total errata are about the same, and when at other angles a greater or less variance is to be expected according to the relative nearness of the principal meridian to the vertical or horizontal. When no corneal error exists, there is total astigmatism against the rule.

DISCUSSIONS ON DR. WÜRDEMAN'S PAPER.

Dr. Noyes :—An experience of seven years with the ophthalmometer of Javel & Schiotz, and upon perhaps 2000 eyes, has given me certain data, about some of which I wish to speak.

The curve of the cornea is not such as to comform to any known methematical figure. Hence, iridectomy for visual purposes, with central corneal opacity, must yield very imperfect vision. But with clear cornea after cataract extraction, visual acuity is just as good with iridectomy as without iridectomy.

A case in point was a man about fifty, who had V. $\frac{20}{20}$ and the ophthalmometer showed 1.00 D. of astigmatism ; the addition of the cylinder gave him V. $\frac{20}{12}$. Hence the irregular curve of the corneal peripery had no damaging effect. Ophthalmometery shows many more cases of mixed astigmatism than would ordinarily be found. This may be only .50 D. or 1.00 D. and it is important.

Vision is almost always less than $\frac{20}{20}$ when the axes of the astigmatism are oblique. The ophthalmometer obviates the result of a mydriatic and I use it much less than formerly, and confine it chiefly to cases where there is great pain and sensitiveness, and its purpose is as an anodyne rather than an essential routine to the optical correction.

The principal meridians are often not at right angles to each other, say 75° and 180° or 90° and 30° and other varieties. In these cases the choice of the patient will usually put the axis at 90° or 180°, and his preference must be respected.

My method usually is, after the first rough test by glasses, to employ the ophthalmometer; then to put behind the ophthalmoscope the required cylinder and find the combination which gives in the upright image a perfect view of the fundus. My own ophthalmoscope is supplied with a clip to carry the cylinder. Then another and pains-taking test by trial glasses will give the proper glass which will be prescribed. I have greatly aided myself in this test by using a card of letters founded on a visual angle of 4′ instead of the Snellen 5′. By these means a single sitting without atropia will usually give a satisfactory conclusion.

With very young subjects mydriatics will more frequently be needed than with adults; but it is also true that children under 12 years will often refuse to accept even high cylinders for constant use and take them only in near work, and in some instances, even for reading, they will sometimes discard them.

Dr. S. D. Risley:—I want to call attention to one remark made by Dr. Noyes, viz., that the glass ordered is the one selected by trial and not upon the basis of the scientific findings of the ophthalmometer. This is in accord with my own experience. The glass must be the one chosen by the patient as giving the highest acuity of vision. Regarding the use of mydriatics the majority of cases suffering from asthenopia fall under the catagory mentioned by Dr. Noyes as needing the sedative effect of the mydriatic. Without their use patients will come selecting different glasses day after day, whereas under their use there is a greater uniformity in this respect, and while at the first vision is below the normal, under their continued use vision will steadily improve although same glass may be chosen.

DR. EUGENE SMITH :—I believe abnormal astigmatism to be any degree of astigmatism existing in cases of asthenopia I depend upon Javal's ophthalmometer, retinoscopy, ophthalmoscope and their verification with the glasses of the old test cases. I do not find it necessary to use mydriatics as frequently as formerly. Their use is in fact the exception. When the radii of lesser and greater curvature do not agree in the two eyes, with the ophthalmometer, I frequently find the patient's head so twisted as to place the eyes on a different plane. When this exists I correct the position of the head and begin over again, and seldom do I find the axes unsymmetrical. The ophthalmometer is invaluable in daily practice, and so is retinoscopy; and I wish to here state that mydriatics are not necessary in a large majority of cases.

Dr. HUBBLE, of Buffalo, N. Y., said that he had tried the various objective methods for determining refractive errors and had derived much aid from the "shaddow test" and the ophthalmometer of Javal. He had learned by an extensive experience with the latter that, in general, the cylinders that should be prescribed should be weaker than the degree of astigmatism indicated by it, and that the greater the astigmatism, the greater should be the under-correction. In a conversation recently, Javal had stated to him that it was generally necessary to increase the amount of under correction, the greater the astigmatism shown by this instrument. In his book on ophthalmometry he had tabulated the differences that should be made.

A recent writer in the Philadelphia Medical News had mathematically demonstrated that, on account of certain errors in the construction of the instrument, the degree of astigmatism that really exists in a given case is less than that shown, and that the difference increases in proportion to the amount of astigmatism. Bearing these differences in mind, the ophthalmometer was exceedingly valuable in determining astigmatism.

Dr. SAVAGE :—Astigmatism, as is well known, can be corrected by either lessening the greater curvature by means of a concave cylinder, or increasing the lesser curvature by means of a convex cylinder. An eye not under the influence of a mydriatic will often prefer a concave cylinder when the refraction is hypermetropic. To avoid the error of prescribing a — cyl. when a + cylinder is indicated, a mydriatic should be used. It has been my practice to use a mydriatic in all my refraction cases under 45 years, and I am so well satisfied with it I shall continue to use it, although it is beginning to be fashionable to do without it. By its use only can we be sure that the ciliary muscle is at rest. No harm can result while much good may follow.

Dr. WÜRDEMANN, MILWAUKEE :—In regard to the use of mydratics in refraction work I find it necessary in fully ¾ of my work. Skiascopy under mydriatics, in favorable cases, is accurate to .25 D., and in the general run of cases without mydriatics .50 or .75 D. may be allowed for the personal equation of the operator. The direct ophthalmoscopic test is accurate to .50 to 1.00 D. with the accommodation paralized, and a still greater error may be allowed, without the mydriatic, for the action of the accommodation of the operator and that of the patient. The ophthalmometer offers us a test which, when accurately done, measures the corneal curvature to within .25 D. For this test we do not need mydriasis.

In all refractive cases we must average all results, allowing a certain amount for the wishes of the patient, but not placing too much stress upon his preference when against the objective test. I consider that even 2.00 D. of total astigmatism with the rule may be considered normal when it gives rise to no asthenopic symptoms, which by the way are caused by over-strain of the accommodation due to close approximation of objects in the endeavor to obtain clearer images. The normal lenticular astigmatism ranges from .25 to 1.00 D., being the difference between the total and corneal. In low degrees of astigmatism, and in eyes with no total astigmatism, we find that the corneal measurements differ more widely from cylinders presented than in those eyes with a high degree of corneal astigmatism. I have ascribed this to my disposition to under-correct high degrees of astigmatism, the same as I generally give an under-correction for hyperopia of high degree.

ABSTRACT OF A PAPER ON "RESECTION OF THE OPTICO-CILIARY NERVES,"

By JULIAN J. CHISOLM, M.D.,
BALTIMORE, MD.

In this paper Dr. Chisolm gives his experiences of the past 13 years. He makes a strong plea for neurotomy as against enucleation, in all cases of eyes which are not deformed in appearance, although they may be sightless, and the cause of much suffering and danger. At the Presbyterian Eye, Ear and Throat Charity Hospital of Baltimore City there have been 81 of these neurotomies, a sufficiently large number to draw safe conclusions from. He has met with none of the dangers which some Surgeons have experienced. In no case has life been jeoparded; nor has there been in a single case any annoying hemorrhage, orbital abscess, cellulitis, corneal sloughing nor, as far as he is aware, eye-ball atrophy. He has not been able to trace all of his cases since they left his hospital. In 4 cases only, as far as he has been able to learn, has enucleation been required as a subsequent operation. Other patients may have been compelled to have had recourse to this more radical method, but if so it has not come to his knowledge. He has been visited by many of his patients years after the neurotomy. He found them enjoying perfect comfort from suffering, and with a good looking eye, infinitely more valuable than any artificial eye that could have been obtained. He thinks that many surgeons have become timid concerning neurotomies from the dangers which have followed the operation at the hands of others, without considering the causes which might have induced the trouble. He thinks that most of these can be traced directly to the operative proceedure.

In the very first year of his trial, he abandoned the elaborate manual as one fraught with danger. The cutting of muscles tended to future deformities, the exposure of the nerve to the eyes of the operator, with the extensive dissections necessary to this end, excited cellulitis, and induced complications. His method of operating is of the simplest. Under a general anaesthetic (he administers the bromide of Ethyl because of its promptness and also its evanescent nature) he makes a horizontal snip of the conjunctiva running parallel with lower border of the inner rectus muscle, the duplicate of that made for squint; when the fascia has been also freely opened by means of the scissors, a sharp hook is passed through the wound and into the sclerotic. By means of this the eye-ball can be rotated forcibly outward, bringing the bundle of nerves within easy reach for section. The enucleation curved scissors is introduced through the open wound to the back of the eye. Using it as a probe the optic nerve is sought. When this cord is felt the point of the scissors, with its closed blades pressing against the nerve, is slowly drawn outward. The moment the nerve escapes, the blades of the scissors are widely opened, the nerve bundle caught between them, and the entire mass divided. The recognized toughness of the optic nerve, and the consequent resistance to the closing scissors is a sure evidence that the proper structures have been secured. As another sign that the section has been completed the closed scissors will move in all directions behind the eye-ball without meeting any resistance. The ciliary vessels have been divided simultaneously with nerves. Blood at once escapes into the socket, causing the eye to protrude from between the lids. Some blood also escapes from the conjunctival wound. To prevent much eye-ball displacement a compress and bandage is immediately applied firmly over the eye, and is left in place for twenty-four hours. Should firm pressure cause pain a hypodermic of morphia brings prompt relief. On examination of the eye the day after the nerve section complete anæsthesia of the cornea is the evidence that the object of the operation has been accomplished. The patient is ready for dismissal after a very few days, the only drawback being a very black eye from blood extravasation, which will take two weeks for removal.

The operation is so simple and rapid in its execution, and so devoid of danger, that patients will accept it who refuse the enucleation. If an eye is ugly looking, as well as painful and dangerous, no surgeon would advise its retention. But when the dangerous eye is still good looking he gives the patient the chance of retaining it by nerve section. He is sure that he has made a great many families happy by this operation, and at the same time has given all the safety that the removal of the eye could have secured.

ABSTRACT OF A PAPER ON

"THE CONSERVATIVE MANAGEMENT OF LACHRYMAL OBSTRUCTION,"

By S. D. RISLEY, M. D.,

PHILADELPHIA, PA.

Dr. S. D. RISLEY presented a short paper on the conservative management of lachrymal obstruction. He claimed there were many cases of partial lachrymal retention liable to be overlooked, since the retention was obvious only under exposure or during the use of the eyes at near work. The retained tears were however the cause of much discomfort in the use of the eyes, because of the resulting conjunctival hyperæmia and the disturbance of the corneal refraction by the pellicle of tears. This condition it was claimed was due in some instances to contraction of the lachrymal punctum, which, as was demonstrated by a series of microscopical sections and drawings, is provided with a sphincter muscle; and in others, to affections of the mucous membrane in and around the nasal end of the lachrymal duct. In treating this condition simple dilatation of the sphincter was often sufficent, but when this failed it should be nicked in the direction of the canaliculus and kept permanently open. In treating the milder forms of blennorrhea of the sac, either acute or chronic, it was often sufficient to nick the punctum which then admitted readily the point of the syringe, and permitted the thorough cleansing of the sac and the application of any desired treatment to its inflamed walls. The closure of the nasal duct, it was claimed, is often due to a uniform thickening of the lining membrane rather than to a localized or limited stricture. The treatment therefore should be directed to the relief of the thickening. While the use of probes was frequently necessary, a successful issue could often be reached by careful syringing and internal medication within them. By the instillation of cocaine into the sac the thickening of the tissues could be reduced and fluids would then flow freely into the nose. After thorough cleansing, solutions of nitrate of silver, grains one to the ounce, tannin or weak iodine solutions could be instilled. The painful probing of the duct could, by this means, be avoided in many cases. When the probes are a necessity they should be only large enough to pass snugly through the duct and should be inserted with great care, certainly without violence, lest the inflamed and brittle membrane lining the uneven surface of the bony duct be torn, and the probe forced downward between the bone and mucus membrane, an accident which always retards the progress of the case and often does permanent injury. In speaking of the etiology of lachrymal disease, he urged the frequency with which the tear duct trouble was associated with nasal disease, in some instances unquestionably secondry to it, while in others the trouble on the floor of the nose and at the anterior end of the inferior turbinated, seemed due to the absence of the usual flow of tears, which allowed the parts to become dry and liable to disease. On the other hand there had, in his experience, been a larger group of patients in which the lachrymal retention, and hyperæmia of the drainage system were unquestionably a part of the chain of symptoms associated with eye-strain. The cases with marked choroidal disturbance associated with astigmatism were especially prone to conjunctival thickening in the retro-tarsal folds, swollen caruncles, and epiphora. Typical cases were detailed to substantiate these views, in which the most varied and pains-taking treatment had been unsuccessful until the existing error of refraction had been corrected, or the nasal trouble removed by treatment. In young children surgical treatment was rarely needed, and two cases were recorded in which the usual treatment was fruitless until other manifestations of syphilis were detected, and rapid recovery from the epiphora followed the mixed treatment alone.

ABSTRACT OF A PAPER ON "RHINITIS CAUSED BY EXOPHORIA,"

By LEARTUS CONNER, M.D.,
Detroit, Mich.

Dr. Connor reported a peculiar and striking illustration of the effects of exophoria. There was absolutely no other deformity of the eyes or general disorder, so that the most distressing rhinitis, which recurred at intervals of a few days and lasted rarely less than two days, was distinctly referable to the exophoria. Attending the rhinitis was deafness, tinnitus aurium and loss of smell. The affection had lasted more than two years and was attended with great and increasing nervous prostration. The correction of the exophoria was followed by a complete cessation of the attacks of rhinitis, and gradually of the deafness and tinnitus and general prostration. The sense of smell at the end of three months after the correction of the exophoria had partially returned.

To more certainly settle the question of the relation of the exophoria to the attacks of rhinitis, the correction of the exophoria was removed for a couple of days when the rhinitis promptly returned. The case is interesting because of the uncomplicated existence of a single cause of the disorder.

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DR. ROOSA'S VIEWS ON "ASTIGMATISM: ITS RELATIVE IMPORTANCE IN ASTHENOPIA DUE TO ERRORS OF REFRACTION" REVIEWED.

In reviewing Dr. Roosa's paper* we propose dealing fairly with him and honestly with the subject under consideration. The Doctor seems to have had three chief aims in the publication of his paper: First, the laudation of the ophthalmometer; Second, the correction of astigmatism, ignoring hypermetropia that may be associated with it if not more than 2.50 diopters; Third, the banishment of the midriatic.

As an aid to the oculist the ophthalmometer is very valuable—almost indispensable. No one can deny that it shows with a high degree of accuracy the curvature of the cornea; and, when the meridians differ in curvature, marks with great precision the location of the two principal meridians. If corneal astigmatism exist it quickly shows whether it is according to, or against, the rule; but in no case does it enable the observer to determine whether the astigmatism is myopic, hypermetropic or mixed. Lenticular astigmatism, far from being uncommon, greatly complicates the findings of the ophthalmometer, for of linticular astigmatism the ophthalmometer can tell nothing. Often does the observer find that a tilting (the accepted cause of linticular astigmatism) of the lens has lessened the effect of the corneal astigmatism, and occasionally that it has increased it: and, too, he not infrequently finds that, the tilling not being in line with either of the principal meridians, the axis of the correcting cylinder must be placed in an unexpected position—several degrees away from the place marked by the ophthalmometer. As valuable as is the ophthalmometer it would be ten fold more valuable if there were no lenticular astigmatism.

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*See Ophthalmic Record Vol. I, No. 12, page 397.

In lauding the ophthalmometer Dr. Roosa most certainly underrates the value of retinoscopy. A comparison of ophthalmometry and retinoscopy will, in the main, be in favor of the latter. Both are means for objective determination. The *time* consumed in these investigations is in favor of the ophthalmometer. The ophthalmometer will mark more accurately the principal meridians. The one tells as readily as the other if the astigmatism be with, or against, the rule. The ophthalmometer tells only the quantity of the astigmatism, while retinoscopy tells both the quantity and the kind. The ophthalmometer takes into consideration only the corneal astigmatism, while the retinoscope reveals the combined corneal and lenticular astigmatism. Both means are time-saving and labor-saving. Neither should be discarded from the armamentarium of the oculist, nor should either be relied on implicitly in the work of refraction. The subjective test by means of the tried and true "*old test case*" of lenses must now and always be resorted to pains-takingly by him who desires accuracy in the work of correcting errors of refraction. The ophthalmoscope, the retinoscope and the ophthalmometer are lower trial courts: the test case of lenses is the court of appeals, in which the judgement of the lower courts is often modified.

As a basis for his argument in favor of correcting astigmatism alone, when even 2.50 D. of hypermetropia exists, Dr. Roosa departs from the usual belief that the emmetropic is the normal eye, and states that the normal eye is the one whose refraction is hypermetropic: but he does not tell us, in so many words, just how much hypermetropia must exist in order that the eye may be said to be normal.

With emmetropia as the standard, we all can have a fixed idea as to the normal eye: with hypermetropia as a standard every man can have an idea of his own as to the normal eye, one having as much right (and reason) to claim 5.00 D. for normal, as another would have to claim that 1 D. is the normal. Argument cannot now be necessary to prove that the emmetropic eye is, and should always be, the standard, the normal eye. Practice based on any other view must always be chaotic.

One about to abandon the "old paths" in refraction work should stop to enquire "Why give glasses at all"? His answer would soon come, "To relieve asthenopia". Immediately another question would arise: "What causes asthenopia"? The ready answer to this question would be "Strain". Eye-strain is understood by all to be abnormal muscle work. What is the character of muscle work done in astigmatism that this condition should be the sole cause of asthenopia, or at least *the* cause before which all other causes pale into insignificance, according to Dr. Roosa? Eye-strain can be divided into only two classes, intrinsic (strain of the ciliary muscle) and extrinsic (strain of the muscles that move the eye-ball). In astigmatism, with the principal meridians vertical and horizontal, the only muscle brought into undue activity is the ciliary.* Just how this muscle acts is a matter not fully settled, some claiming that the whole muscle acts clonically, thus, at different moments, focusing on the retina the rays in the planes of the two principal and intervening meridians. Others claim that there is a tonic contraction of two opposite sections of the ciliary muscle in the plane of that meridian of the cornea with least curvature, and in this way increases the refractive power of a corresponding part of the lens, thus neutralizing in part, or in whole, the corneal astigmatism. Still another view, not at all improbable, is that at one point the meridional fibers (Bowman's) of the ciliary muscle contract and tilt the lens so as to give lenticular astigmatism at right angles to the corneal. Which-ever view is correct there is, beyond question, ciliary strain in cases of uncorrected astigmatism, which strain all agree is one of the causes of asthenopia. To relieve the asthneopia the astigmatism must be corrected: to correct the astigmatism carefully and accurately the ciliary strain, whatever its nature, must be suspended by a mydriatic, unless the patient, because of age, has lost ciliary power.

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*The astigmatism could be so great as to compel the patient to hold the book too near the eyes and thus make the internal recti do too much work.

In oblique astigmatism there is the same kind of ciliary strain as in the non-oblique, and in addition there is symmetrical strain of the oblique muscles:* the higher the degree of the astigmatism and the greater the obliquity of the principal meridians, the greater the strain on the obliques. Because of the dual nature of the strain in oblique astigmatism we would naturally expect it to be the cause of greater asthenopia than results from non-oblique astigmatism.

The ciliary strain exists in all kinds of astigmatism, and its suspension, by means of a mydriatic or age, is a pre-requisite to perfect accuracy in the adjustment of cylinders. All varieties of astigmatism should be corrected fully in cases of asthenopia, and all the aids at our command should be used in order that the best results may be obtained.

But can astigmatism be the only cause of asthenopia? Dr. Roosa, in his paper, says that hypermetropia is one of the causes, but he teaches that it is an inoperative cause when of lower grade than 2.50 D. unless conjoined with astigmatism. The character of ciliary strain in hypermetropia is tonic and general, and is just as capable of causing asthenopia as is the ciliary strain in astigmatism. Tonic muscular contraction is even more likely to result in fatigue and suffering than is clonic contraction. The emmetropic eye is beyond controversy, the eye that is freer from troubles of every kind; and any variation from this standard that excites muscle strain in order to approximate good vision is an undesirable condition. Whether we have astigmatism or hypermetropia there results eye-strain that can, and does, excite asthenopia in some of its varied forms. Both of these condi-

*See Ophthalmic Record, No. 1, Vol. 1.

tions, whether existing alone or together, should be corrected in order to relieve the strain. When they co-exist, a correction of the one or the other, by removing one of the factors constituting the cause, will give temporary relief more or less complete; but after a longer or shorter period the uncorrected factor will cause a return of the asthenopic symptoms.

It is difficult to produce one single sound scientific or clinical reason for not correcting the hypermetropic error, as well as the astigmatic, in any case of asthenopia. The full correction makes the eye artificially emmetropic, giving sharp distant vision without strain, and allowing near work to be done with only that amount of strain that is exercised by the emmetropic eye. The uncorrected hypermetropic eye, because of the strain necessary for seeing, is far more susceptible to pathalogical conditions than is the natural or artificial emmetropic eye.

It is well known that eye-strain is a prolific cause of styes, marginal blepharitis and chronic conjunctivitis. While it is not so well known it is equally as true, that eye strain causes intraocular troubles, such as diseases of the iris, ciliary body, choroid and retina, and secondarily, because of altered nutrition, that common source of blindness, cataract.* The more general becomes the custom of correcting astigmatism, hypermetropia and myopia, the fewer will be the number of patients suffering with the diseased conditions named above; and asthenopia dependent on these errors will have no existence in the cases corrected. The clinical reason given by Dr. Roosa for not correcting the hypermetropia in some of his reported cases, viz: that they were more comfortable without than with the spherical correction, no doubt had its foundation in a want of careful centration (or decentration if needed) of the lenses, or in allowing them to occupy a tilting position in front of the eyes. No pair of eyes free from heterophoria will long refuse to take kindly the lenses that will help them to focus parallel rays on the retina without strain, provided the proper attention has been given to the cutting and placing as well as the grinding.

For scientific reasons the mydriatic should not be banished. Only when the ciliary muscle is in a state of rest can an absolutely accurate study of the refraction of the eye, by any and all means at our command be made, even by those who, because of long experience and careful study, are most expert. Mydriatics alone can put the ciliary muscle of young and middle aged people in a state of rest. It does no harm when used in these cases, and for the time acts as a sedative. If homatropine be chosen (and it is wholly reliable when properly used) the inconvenience caused by the dilated pupil and suspended accommodation passes away of its own accord in thirty-six to forty-eight hours; and by use of a solution of eserine may be brought to and end in a much shorter time.

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* See Risley's paper in Vol. of proceedings, Section Ophthalmology, A. M. A., 1891, page 25.

The traveling quack oculist will hail with delight the verdict of respectable oculists banishing the mydriatic, for he knows that those on whom he would practice will not allow him to put such medicine in their eyes. He will invest a few more hundred dollars in showy instruments, without having knowledge how to use them, and will travel from place to place announcing his wonderful equipment and publishing in the daily papers that "Doctor so-and-so, a most famous oculist, has declared it wholly unnecessary to put any medicine in the eyes in order to give correct glasses, since the invention of these wonderful instruments." But it must be confessed that this reason would not stand unless there were scientific reasons for holding on to the mydriatic, a "*magnum Dei donum*" for which we all should be thankful.

This review can be justly extended a little further because of a quotation made by Dr. Roosa from Berry, which is to be found in a foot-note on page 401, Vol. 1, of this journal. Berry is young and will live to see the day, should he, with an unprejudiced mind, continue to be an investigator, when he will take no pride in reading a part of his paper (that part quoted by Roosa) recently read before the Ophthalmological Society of the United Kingdom. The oculist who believes that there is no ocular cause for asthenopia except errors of refraction is greatly deceived; and of this he can convince himself by careful study, and clinical investigation. Heterophoria has a real existence, and is a very common cause of the various symptoms included in the term asthenopia. Many of these cases can have their heterophoria corrected and comfort secured by decentration of the lenses required for focal correction; while there are many more cases that must continue to suffer unless relieved by a partial tenotomy (not a so-called, but a real) which can be done easily, but must be done carefully. A safe line can be drawn between operative and non-operative cases.*

* See Ophthalmic Record, double No. 7 and 8, vol. 1.

NEWS ITEMS.

DR. LANDOLT ON CATARACT.

The *Record* is fortunate in that it will publish soon an exhaustive paper on Cataract written by Dr. Edward Landolt, of Paris. The paper is now in the hands of Dr. Culver who will make a perfect translation of same. The paper will occupy about sixty pages, and will be read with great interest by every subscriber to this Journal. It is expected that Dr. Landolt's paper will be ready for the next issue.

The Annual of the Universal Medical Sciences, for 1892' in 5 vols. is now ready for sale and delivery. The editor, Dr. Sajous, is to be congratulated on getting so good work out of his small army of associate editors. The value of these volumes can be seen when it is stated that all that has been published during the year, in 1027 Medical Journals in this and other countries, has been examined, and the best thoughts have been culled and brought together for the ready reference of the busy practitioner.

The best specialists are those who, not content with only the literature of their own department, learn all that they can about the other departments of medicine and surgery. Sajous' Annual will furnish this information at a minimum of cost in time and labor.

Not only have the Journals been searched for thoughts of value, but all new books and monographs also have been passed beneath the scrutinizing eyes of the editorial staff of the Annual.

$100.00 PRIZE.

Dr. G. M. Gould, editor of *The Medical News*, Philadelphia, offers a prize of $100.00 for the best essay on "Modern Homeopathic Practice," with the view of showing historically and accurately what he terms the "*ridiculous pretensions*" of same. Competing essays must not contain over 15,000 words, must be written in a simple and direct style adapted to the commonest lay understanding. The papers must be in hand Jan'y. 1st, 1893: must be type-written and signed *nom-de-plume*. A sealed letter associating real name and *nom-de-plume* must accompany each essay. The essay receiving the award of the committee will be published for general distribution, and will be sold to physicians at actual cost.

This offer is made in Dr. Gould's published address on Quackery.

Dr. R. O. COTTER, of Macon, Ga., an earnest and conscientious worker in Ophthalmology, has recently been elected president of a bank in Barnsville, Ga. Because of this new duty he has associated with him in his practice Dr. C. H. Peete, a former pupil of the editor of this journal. It is needless to say that the writer believes Dr. Peete worthy of the honor which he has received. It is to be hoped that Dr. Cotter will not become so infatuated with a banker's life as to be led, later, to abandon the practice of ophthalmology.

In this issue will be found, fronting last page of reading matter, the full page advertisement of Shiefferlin & Co. Oculists will be specially interested in Aristol and Europhen, both of which are valuable additions to our list of remedies.

There is no ophthalmic journal published in the English language that English speaking ophthalmic surgeons can afford to do without. While the editor of the *Record* wishes his journal to go to the office of every oculist in the United States and Canada, he would be glad to know that its contemporaries are to be with it. We intend that the *Record* shall be useful as a bearer of information; and, that, reflexly, it shall make other journals increase in usefulness. If you are not a subscriber we wish you to become one, and thus help in a good work.

Department of Otology, Laryngology and Rhinology.

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NASHVILLE, TENN.

Continuation of the
SCIENTIFIC PROCEEDINGS OF THE
Section of Laryngology and Otology of the A. M. A.,
at the Detroit Meeting, June, 1892.

EUCALYPTOL IN DIPHTHERIA.

BY MARION THRASHER, M.D.,
SAN FRANCISCO, CAL.

An epidemic of Diphtheria pervaded portions of San Francisco, during the winter months of 1891–92.

It was most plentiful and virulent in that part of the city where the sewage became stagnant in the subterraneous conduits. The writer was located in that quarter, and had ample opportunity for practical study in this much-to-be-dreaded disease, Diphtheria.

California, years ago, imported the Australian gum tree—the *Eucalyptus globulus*—for shade, it being a tree of rapid growth. The people soon learned that it absorbed malaria, and many other floating germs of diseases, transforming unhealthy into healthy localities.

The writer did not fail to notice, that, in the above epidemic, diphtheria was rarely found in houses, surrounded by eucalyptus groves; and when it did exist, it had been transplanted, and was very mild, or it sprang up through neglected sanitary conditions.

From the fresh leaves of the Eucalyptus, are extracted two terpenes,one of which is eucalyptol. The eucalyptol is a powerful germicide, a disinfectant, a stomachic, a tonic, a stimulant, and anti-periodic. In small doses, it produces mental activity, accelerates circulation and respiration, excites salivary secretion, promotes appetite, causes diaphoresis and increases the elimination of urea. It is expelled from the system through the mucous membrane of the faaces, trachea, bronchi, skin and kidneys. In short, it possesses, all of the characteristics that a remedy should possess, to meet the requirements of the pathological conditions found in a typical case of diphtheria. Theoretically it is perfect, and practically it is as near a specific as any one remedy that we have found.

The exudation, in diphtheritic inflammations, is not only upon, but within, the substance of the mucous membrane. Eucalyptol applied locally, destroys the external exudation, the product of the Löffler-Klebs bacillus-and taken internally, is excreted through the mucous membrane, thereby ridding the diseased tissue of its toxic growth. Anorexia, a prominent symptom, is overcome by the stomachic and tonic effect of the Eucalyptol. Blood poisoning is early noticed in the saffron skin. This may be counteracted and overcome usually with Eucalyptol, bichloride of mercury and quinine.

Cardiac weakness, should be promptly anticipated, with a generous diet of milk and eggs, supplemented hourly with brandy and digitalis. Ventilation should be as perfect as possible, and everything in the sick chamber kept disinfected and scrupulously clean.

The writer uses a ten per cent solution of Eucalyptol in pure alcohol, and applies it locally to the diphtheritic exudation every hour, day and night, and hourly administers nutrients, tonics and stimulants.

Dr. Forcheimer's article in the April number, 1891, of the International Clinic, on Tonsilar Diphtheria, first called the writer's attention more particularly, to the value of Eucalyptol in the treatment of throat infections. Neither trypsin, papayotin, nor per oxide of hydrogen, are comparable to it, in the treatment of diphtheria. The etiology and pathology of this disease, so aptly named, the "enemy of childhood," were so illy understood until quite recently, that medical treatment only increased the gravity of the prognosis. The false idea, universally prevalent, that the diphtheritic membrane, was but a fungous growth upon the throat surface, only to be destroyed by cauterization, was but adding fuel to the fire. No physician was dextrous enough to "swab" the throat and touch only the diseased part; much less the inexperienced nurse, to whom this task usually was assigned. This operation would be difficult enough, were the patient an adult, which was seldom the case, but when it was a crying, squirming, fighting child, is it any wonder that the lunar caustic made dozens of blistering patches on the hitherto healthy tissue, on which the false membrane would further spread.

Need we be astonished that, under such misconception of pathology and treatment, the disease attained such an alarming mortality?

The fatality is greatest among children from three to five years of age, for no other reason than from the fact, at this age, it is so difficult to practically apply the usual remedies in throat medication. But the Eucalyptol solution is an exception. The writer when he finds it impossible in early childhood to apply the saturated sponge directly to the diseased surface, pours hourly, or half hourly a teaspoonful of the medicine, down the child's throat, holding it, the meanwhile. Its struggles will bring the solution in contact with the diseased mucous membrane, and accomplish the same purpose the gargle or swabbing does in an older patient. Should it come in contact with the adjoining healthy tissue it will give tonicity to the parts and render them, as well, antiseptic, thus preventing the spread of the exudation.

ABSTRACT OF A PAPER ON
"CATARRHAL SORE THROAT IN THE LAKE REGION,"

By J. M. G. CARTER, M.A., M.D., Sc.D., Ph.D.,
Waukegan, Ill.

Prof. of Pathology in the College of Physicians and Surgeons, Chicago,
Fellow of the American Academy of Medicine, etc.

Read in Abstract before the A. M. A., Detroit.

This paper discusses only those cases which are properly termed catarrhal, and does not include cases of membraneous croup and diphtheria. These catarrhal cases occur very frequently on the lake shore. During a residence of nine years at Waukegan, on the shore of Lake Michigan, the writer has treated several thousand cases of sore throat in various forms, of which about two thousand were catarrhal. These inflammations sometimes are confined to the tonsils, sometimes to the pharynx and sometimes to the larynx, but often the entire throat is involved.

The study of the etiology of this class of diseases has occupied much attention, and they have been attributed to northeast winds, north winds, west winds and various degrees of temperature: and also bactoriological influences have been supposed to prevail. The writer is led to believe after a careful study of the facts, and after a series of clinical and meteorological observations, that the causes of these catarrhal conditions are cold moist winds, chiefly from the lake, the presence of ozone in the atmosphere and the electrical changes indicated by the cyclonic disturbances nearly always noted in these endemics. He further believes that many forms of these cases may be traced to bacterial origin. The probability is that the climatic etiological agencies induce a susceptibility to infection in the mucous membranes and that thus a nidus is formed for bactiria, which finding here a favorable point from which to work, spread their poisonous products through the system. These cases usually recover in from three to five days.

The treatment is simple, consisting mainly of gargles, sprays and inhalations. Gargles of glycerine, alcohol and water often act well. Cold or hot sprays of the permanganate or chlorate of potash or of the common astringent preparations are excellent in many cases. Inhalations of alcohol, camphor and menthol act efficiently when the inflammation extends into the larynx, trachea and bronchi. A mixture of ice and cream has the double advantage of alleviating the throat symptoms and yielding nourishment to the patient. Small doses of aconite, quinine and Dover's powder or belladonna are often excellent adjuvants in these cases.

ABSTRACT OF A PAPER ON "A FATAL CASE OF MASTOIDITIS OF THE BEZOLD VARIETY,"

BY H. KNAPP, M.D.

NEW YORK.

The escape of pus was through a fistula on the medial side of the tip of the right mastoid. This affording only temporary relief, the mastoid was extensively chiseled open and pus was found in the antrum and the cells at the base and along the inner side of the process. The patient felt well for six weeks when cerebral symptoms—intense obstinate headache, nausea, occasional vomiting, dizziness, stupor and impediment of speech—set in and continued until death, three months later. The disease had begun by repeated attacks of coryza with earache and catarrhal otitis media, for which she consulted Dr. K. once before the mastoiditis made its appearance. The patient was pregnant and did not call until after her delivery. After the opening of the mastoid pleuritic exudation appeared, with moderate fever (temp. 102° at the highest) and was completely recovered from in two weeks. When the cerebral symptoms manifested themselves Dr. K. proposed to open the skull, but the operation was only consented to one day before her death. Six weeks after the appearance of the cerebral symptoms, quite suddenly, a hard, round, painful swelling appeared on the medial side of the upper portion of the sterno-mastoid muscle of the left (unaffected) side. The left ear was healthy. No swelling or discharge from the diseased mastoid. Throughout the whole disease there was no otorrhœa. The drumhead was red, in its upper part bulging. Four weeks before death congestion of both optic discs was noticed which developed into well-marked optic neuritis.

The temperature varied between 99° and 101°, the pulse between 70 and 90, in the last days falling to 60. There were no chills and no localized tenderness on percussion of the skull. The diagnosis was an entradural collection of pus, or cerebral or cerebellar abscess. The relatives had repeatedly been told that without an operation death was sure, with an operation probable. They consented only when they and the patient were exhausted. Dr. K. enlarged the opening in the mastoid, went into the attic of the tympanum. Not finding any puss he penetrated into the brain by chiselling the inner wall of the mastoid process away: no pus, dura mater and lateral sinus healthy. He made another opening into the skull-cavity above the auditory canal: dura mater and superficial layers of brain healthy. He then gave the case up as hopeless. Death in three-quarters of an hour.

Autopsy: At the inner wall of the tip of the mastoid a fistulous opening in the bone. Occlusion of latural sinus by a dense clot: lepto-maringitis of right temporal lobe and cerebellar hemisphere: abscess in right temp. lobe and another in cerebellar hemisphere: purulent thrombo-phlebitis of the sagittal and left lateral sinuses extending into the external jugular.

The case will be published in full in the July number 1892, of the Archives of Otology.

ABSTRACT OF A PAPER ON "OPACITIES OF THE MEMBRANA TYMPANI,"

By Dr. DOWLING,

Cincinnati, O.

In a large number of the ear cases which present themselves for treatment in our every day practice, where there is more or less deafness, you will find a certain per centage with no evidence of ear disease. In a still larger per centage of these cases, the drum-head of one and often of both ears, shows evidence of opacities, either circumscribed or general, with more or less thickening of the membrane.

These opacities when present are usually the result of an antecedent inflammation of the external meatus, or catarrh of the cavity of the tympanum, or senile changes from advanced age.

About two years ago I commenced a series of investigations in the treatment of these opacities of the drum-head with a view to clearing them up, and restoring the membrane to a fair degree of usefulness and getting an improvement in the hearing power.

The treatment consisted mainly of penciling the drum-head, and the adjoining parts of the external meatus, with various medicated solutions.

Altogether something like a dozen different remedies were used, in solutions of water, glycerine, olive-oil and albolene. The applications were made from once a day to twice a week and were continued from one to eight months in each case.

I obtained better results from an oily solution of phosphorus and strychnia, in various strengths, than from any of the other remedies tried.

The remedy I think does good by directly stimulating the membrana tympani, thus increasing its nutritive activity, which in these opacities is usually below par, and thus getting rid of the opacities by absorption of the exuded or deposited material giving rise to them. I found the influence of the remedy particularly marked in cases of opacities arising from catarrh of the cavity of the tympanum, caused by attacks of la Grippe during the late epidemic of that disease.

In the opacities of elderly people, as a result of senile changes, the remedy sometimes did a great deal of good and then again there was no apparent improvement, even after months of patient treatment. In about ten per cent of these cases I succeeded in improving the hearing by the use of this remedy.

The strength of the solution ought to vary from one grain to five to the ounce according to the degree and standing of the opacities.

The cases should be treated for months, the longer the better, and patients should be told at the start that they need expect very little improvement in their hearing short of at least two months treatment.

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* A COMPARISON BETWEEN CERTAIN METHODS OF TREATMENT IN ACUTE TONSILITIS AND PHARYNGITIS, WITH A REPORT OF ONE HUNDRED AND SIXTY-NINE CASES.

By JAMES E. NEWCOMB, M. D.,
Attending Laryngologist Demilt Dispensary, Assistant Roosevelt
Out-Patient (Throat) Department,
New York City.

Under the title of pharyngitis reference is here made only to the various forms of catarrhal inflammation. Under tonsilitis are included the lacunar and parenchymatous forms of the disease, and as well peri-amygdalar cellulitis or quinsy. No allusion is intended to the pathology, symptoms or possibly infectious character of these diseases. The question is merely one of treatment. The three remedies used have been salol, guaiac and salicylate of soda.

* Abstract of a paper read at the meeting of American Medical Association, Detroit, June 10th, 1892.

Unfortunately the most important factor in therapeutics is the most variable, viz, the individual constitution. This renders it difficult to adopt any standard by which to measure and compare the effects of our remedial measures. In these diseases under consideration the most painful symptom is the difficulty (almost agonizing at times) in swallowing. Even here our comparison is relative rather than absolute, for one man will be overwhelmed with an amount of pain which to his neighbor is a mere annoyance. When our patients are able to swallow again comfortably, the battle is in their opinion already fought, and the victory won. It is therefore with reference to the removal of this symptom that the remedies named have been carefully given and the number of hours noted before relief was obtained.

In these simple throat cases, the doctrine of their self-limitation must not be overlooked. If the curve of "cure" coincides with that of the natural subsidence of the disease, it is an open question as to how much our remedies have done. Most of these acute throat catarrhs run their course in from two to three days. It is therefore evident that we must classify our cases according to the time, in the period of their evolution, at which treatment begins, viz.

1. Cases in which treatment is begun on the first or second day of the disease.
2. Cases in which it is begun on the third day.
3. Cases in which it is begun after the third day.

Salol was employed in 81 cases as follows.

Class 1. 36 cases, average hours before relief 11 +.
Class 2. 15 cases, average hours before relief 14 +.
Class 3. 30 cases, average hours before relief 14 +.
Average of all the salol cases 13+.

Guaiac was employed in 44 cases.

Class 1. 20 cases, average hours before relief 18 +.
Class 2. 10 cases, average hours before relief 23 +.
Class 3. 14 cases, average hours before relief 11
Average of all the guaiac cases 17 +.

Sodium salicylate was also employed in 44 cases.

Class 1. 15 cases, average hours before relief 24.
Class 2. 12 cases, average hours before relief 17.
Class 3. 17 cases, average hours before relief 15 +.
Average of all the salicylate cases 18 +.

As will be seen by reference to the figures the preference is in favor of salol. It must be said that in all of the 9 groups of cases, some complete failures are recorded, that is, the painful swallowing did not disappear any earlier than it might have done, had no medicine whatever been given.

It is of interest to note just what is the relation of these one hundred and sixty-nine cases to the rheumatic diathesis as a causative factor in their occurrence. In all but seven this point was definitely ascertained. Of the one hundred and sixty-two remaining cases one hundred and fifty, or seventy two, had neither personal or inherited rheumatic manifestations. Furthermore dividing the cases into rheumatic and non-rheumatic groups, we find that the latter were relieved just about as quickly as the former. Then with these data before us, we cannot accept the doctrine so exclusively urged by many authorities that all these sore throats are essentially rheumatic in their nature

The writer's views as to treatment are summed up as follows:

1. We have in salol a remedy which, in the majority of cases, will relieve more quickly than any other. Occasionally it utterly fails. When it does so, the old combination of iron chloride with potassium chlorate, answers better than any other substitute. This latter combination seems to answer especially in those cases where an acute angina supervenes upon a mucous membrane altered by repeated previous attacks. The dose of salol is five grains in mucilaginous suspension every 2 hours. Capsules are to be avoided. Tablets may be used if the patient can swallow them. In quinsy pus rarely forms before the fourth day. It should be evacuated as soon as formed. Care must be taken to incise where the pus is, not in the tonsil but in the cellular tissue above and in front of (less frequently behind) the tonsil. The pus cavity should be gently syringed with an antiseptic. Treat it as you would an abcess anywhere.

Guaiac is disagreeable to take, the dose is one dram of the ammoniated tincture in hot milk every two hours, gargled and then swallowed. Salicylate of soda (five grains in solution every two hours) is also nauseating to many stomachs.

2. An incision is indicated where we have peri-tonsilar engorgement and free bleeding promoted by a warm water gargle. We ought not to wait for actual pus formation.

3. A mercurial and a saline should invariably precede our remedies, no matter which one used.

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THE

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Continuation of the
SCIENTIFIC PROCEEDINGS OF THE SECTION OF OPHTHALMOLOGY OF THE A. M. A.,
At Detroit, Mich., June, 1892.

ABSTRACT OF A PAPER ON

"THE METHOD OF EXAMINING THE EYES OF SCHOOL CHILDREN."

By B. ALEX RANDALL, M.D.,
Philadelphia, Pa.

Under this title Dr. Randall touched upon the hygienic importance of such studies and the shortcomings of many heretofore made, and gave a plan under which practical and scientifically valuable data could be obtained at the minimum cost of time. Distant vision and astigmatism are tested for each eye by artificial light, the muscle balance by Maddox prism or rod for a far point of light and for a near dot-and-line or pen-point; the punctum proximum of each eye for Jaeger i; the refraction by the direct method, retinoscopy, and if need, by test lenses; the color sense by Holmgren's worsteds; and these data, together with notes of the health, any eye trouble, glasses, etc., could be entered on a form headed by the race, age, sex, school and class of the pupil and the date. Recording these results himself, he was able, in an examination of 356 boys in the Penn Charter School of Philadelphia, to examine about a dozen per hour: with a clinical clerk an expert observer could easily make twenty such examinations in an hour, learning practically all ordinarily sought in the first study of the careful specialist. Less than this generally leaves the findings too incomplete and vague to have value to science or to the individual. More can easily be studied out if time permits.

DISCUSSION.

Dr. J. D. Risly was fully in accord with Dr. Randall as to the need for thorough examination, if the work is to be of any value.

To simply take the acuity of vision or record the glasses selected by the individual is not sufficiently accurate to make the results worth the expenditure of time and strength required to collate the statistics. The examinations as outlined by Dr. Randall allow also the careful analysis of pathological states in relation to states of refraction, a matter of great importance to those who believe that the increase of refraction in the eyes is dependent upon the diseased conditions.

Dr. Dowling:—I am very much interested in the subject of Dr. Randall's paper on the examination of the eyes of school children. About two years ago I began a series of examinations in the schools of Cincinnati with a view of determining the number of children who are afflicted with myopia. I examined about one thousand in all. In many instances I had the sanction and co-operation of the teachers, while in other schools I could not get this. There was a general opposition to the use of a mydriatic in the eyes on the part of the parents of the children, which interfered materially with the scientific exactness of the investigation.

I found there were about one third more myopes among the German children than among the English speaking races with the same conditions as to age and school grades. The use of the German text in the German school books seemed to contribute a goodly share to produce this result.

In bringing this matter before the school board I suggested that in the next contract for books they exact that they have latin letters substituted for the German.

Seventy per cent of the children in one German school were myopic. There was a very bad condition of ventilation and light in this particular school. We ought to unite as a body in our efforts to induce the school authorities to allow, and aid in, these examinations of the eyes of school children by members of our profession. They are calculated to bring about many reforms in the hygiene of our schools, and do a great deal of good.

Dr. RANDALL said, in closing, that he thought it needless to go into the general question of how important these studies were in furnishing a basis for our whole understanding of refraction matters. The direct hygienic value of such examinations should be great, both for the scholars as a body, and for the individual; but in order to prove so, they must have the thorough good will of the school authorities who have in hand application in school and the transmission to the parents of the results found. The examination should therefore be as full and accurate as possible, or it will only cloak, instead of revealing the evils; they must be made with dispatch, or they will be discontinued as a waste of the pupil's time. He had tried to lay down a method of study capable of giving fairly full and accurate results in most of the important directions at a cost of from five to three minutes of time.

ABSTRACT OF A PAPER ON

"A FEW EXPERIMENTS WITH THIERSCH'S SKIN-GRAFTS IN THE OPERATION FOR PTERYGIUM,"

By F. C. HOTZ, M.D.,

Chicago, Ill.

To insure the permanent success of our operation for pterygium we must see to it that the conjunctival fold, after being released from the cornea, will not be drawn back over the cornea again In pterygia of moderate size this is usually accomplished, if we close up the gap in the front of the retracted pterygium by drawing the ocular conjunctiva from above and below together to a transverse linear wound. But if the pterygium is very wide, the defect in the ocular conjunctiva is often so large that the wound edges cannot be united without great strain on the sutures; they often tear out and the edges separate; cicatricial tissue fills the gap, and return of the pertygium fold is the ultimate result.

In looking for some suitable material which might be substituted for the conjunctiva in such cases, Dr. Hotz thought of Thiersch's Skin-grafts which in cases of symblepharon had proven themselves an excellent material for patch-work in the conjunctiva. He has tried this grafting in three cases. The pterygium was carefully dissected back from the cornea, sclero-corneal region and allowed to retract toward the caruncle as much as it would. Upon the large wound area resulting from this retraction of the conjunctiva a Thiersch graft was placed, shaved off from the forearm and transported from the razor directly to the eye-ball. It was found best to cut the graft a little smaller than the wound, especially in the horizontal diameter. Carefully spread out smoothly over the wound, with one edge following the border of the cornea, the graft adhered quite readily; after two weeks its whitish color blended well with the white of the eye.

The grafting experiment was successful in all three cases, in-as-much as the grafted piece of skin adhered firmly to the sclera along the corneal border and formed a strong barrier, which effectually keeps the conjunctiva off the cornea.

Dr. Hotz therefore thinks this plan of skin grafting may be recommended as an operative procedure for these troublesome cases of extensive pterygia.

DISCUSSION.

DR. PRINCE:—The thanks of the section are due to Dr. Hotz for his valuable paper. Excellent results have followed in those cases in which I have made transportations.

The first of them was an extensive burn, destructive of the conjunctiva with the result of forming a symblepharon causing adhesions of the lower lid with ball. In this case the transport was taken from the rabit. The second operation was a marked blepharo-phymosis in which, after making a canthotomy, I transported a rhomboid from the inner surface of the lips.

In each of these cases the transport adhered and greatly ameliorated the symptoms.

DR. A. R. BAKER, Cleveland, Ohio:—This contribution of Dr. Hotz cannot fail to be a permanent value especially in the treatment of symblepharon and other conditions in which there has been a large loss of conjunctiva. But it seems to me it cannot take the place of the old operation of transplantion which undoubtedly you all make. Dissecting off the pterygium an incision is made on the lower part of the ocular conjunctiva beneath the lower lid, a stitch is put through the apex of the flap and the pterygium transplanted beneath the lower lid, where in the course of a few weeks it disappears and cannot be distinguished from the normal conjunctiva. It does not seem to be a favorable soil for the nourishment of this growth. In the case of a large pterygium half can be transplanted above, and the other below, the cornea. By this method there is no loss of tissue and no necessity for skin grafts.

I have never seen a return of the pterygium when operated upon by this method. Nearly one-half of my operations have been in cases in which some other operation had been made.

DR. HORACE M. STARKEY:—While the treatment of pterygium is not the subject of Dr. Hotz' paper, the discussion having been turned to that subject, I wish to make a suggestion. I have employed electrolysis for several years for the treatment of those cases particularly in which there is the minimum of connective and fibrous tissue and the maximum of vascular tissue. Under cocaine a current of from three to five milliamperes is passed by means of a platinum needle, when the blood vessels are seen to shrivel and, with but little reaction, the pterygium soon diminished. In one case seen three years ago, a single treatment in this manner so reduced the size of the growth that the patient has against advice neglected further treatment. He has been seen a number of times and the slight remnant of the pterygium remains unchanged.

I have not treated a sufficient number of cases in this way to make a report of them, but throw out these suggestions that others may, if they desire, try electrolysis in suitable cases.

Dr. Savage:—Some years ago from some *confrere* I learned to separate the corneal attachment of the pterygium by forcible traction. This is the method: Puncture the conjunctiva at the corneal margin at upper and lower border of the growth; through first one puncture, then the other, introduce one blade of a pair of scissors and make a V shaped incision with open part toward the cornea. Thus separated from its base dissect it carefully to corneal margin, then seize it with a strong pair of fixation forceps, draw towards the temple while the patient looks, by request, to the opposite side. In this way the very roots, as it were, of the pterygium are removed from the cornea. Over this clean surface epithelium soon forms, and a return of the growth is not so likely. In most cases one or two stitches will sufficiently close the conjunctivial wound. In some cases the suggestion of Dr. Hotz could be well followed. I expect to put his suggestion into practice.

ABSTRACT OF A PAPER ON "TRICHIASIS—DISTICHIASIS."

By EUGENE SMITH, M.D.,
Detroit, Mich.

Apply Snellin's clamp and make an incision with a Beer's knife or other thin knife along the free border of the lid, between the normal and faulty cilia, as in the Jarsche–Arlt transplantation.

The incision is carried well up beyond the hair follicles, two or three lines in depth. The wound usually gapes, if not, I lift the anterior lip of the wound with forceps, wipe off the slight amount of blood and find the hair follicles plainly in view. The *region* of the *hair follicles* of the inverted cilia, or all the follicles on the posterior lip are touched with the galvano-cautery by gently drawing the point from one end of the incision to the other. A Paquelin cautery may be used.

Where a group of faulty cilia are attached to the anterior lip they are to be touched with the cautery. Wound may be washed with 1-500 solution of sublimate, and a compress wet with the lotion is applied and held in position with a bandage or strip of adhesive plaster.

The dressing may be removed in 24 hours, when the wound will be found healed by first intention, and the inverted lashes will have dropped out or may be easily removed with cilia forceps.

I present a case operated on yesterday which speaks for itself. The operation is simple and efficient.

DISCUSSION.

Dr. Hotz took exception to the remarks that *all* operations for trichiasis leave disfiguring scars on the lid. The Arlt and similar operations do it and leave the lid in worse shape than before the operation. For the operation he usually performs he claims that it leaves no difiguring scars and re-establishes a more natural appearance of the lid. He makes a deep incision into the free border behind all the cilia, to split the lid into an anterior (cutaneous) and posterior (conjunctival) flaps. An incision is made along the upper border of the tarsus, and the skin of the lid fastened to this upper border of the tarsus by sutures, the anterior edge of the lid containing the cilia is turned up and well separated from the conjunctival flap. Into this gaping wound of the lid border a long and very narrow skin graft is placed which restores the full width of the free border and holds the cilia-bearing edge well up and away from the eye-ball. If trichiasis, as he understands the term, is that deformity in which there is a complete inversion of the lid border complicated by irregular growth of the cilia, we cannot well distinguish in these cases between faulty and normal eye-lashes, and it is difficult to understand how the destruction by cauterization of a part of the hairs can relieve the trouble, for if the wound closes up the anterior flap will be drawn into its former inverted position, and the eye-lashes left will again be directed toward the eye-ball.

Dr. SAVAGE:—Some years ago I devised an operation for trichiasis and distichiasis when they amount to much, and for entropion, which I practice often. It consists of the Burow incision with a vertical cut at either end of this, all the incisions going through the tissues to the skin. This leaves the lid margin free to be turned out by means of a few double stitches, which are taken as follows:

The needle entering the Burow incision is brought out through the skin just above the eye-lashes; it is then made to penetrate a fold of skin (lifted up by forceps) one fourth inch above (if on upper lid). After passing a sufficient number of stitches in the same way they are tied, beginning with the middle one. The portion of skin between the two stitches and behind the thread, by folding backward, greatly facillitates the out-turning of the lid margin. The Burow incision is made to gape widely and is thus allowed to fill with plastic material, which becoming organized prevents the margin of the lid from again throwing its lashes against the globe. The stitches are allowed to remain three or four days. This operation not only turns the margin of the lid out sufficiently, but also elongates it.

Dr. Eugene Smith in reply said:—I cannot agree with Dr. Hotz that trichiasis is due to absorption of inner lip of eye-lid. I look upon such cases as entropion. I usually find the portion of lid affected, except when due to a cicatrix, nearly or quite normal; and that there is a space between the faulty cilia and the cilia which are normally situated. I choose this space for my incision, as you see in this case which I bring before you, and which I operated upon yesterday before several members of this Section. As you see the wound has healed by first intention and the faulty cilia dropped out as I removed the dressing this a. m.

The case speaks more for itself than I can for it.

Effectual, no deformity, quick result.

ABSTRACT OF A PAPER ON

"THE SURGICAL TREATMENT OF TRACHOMA,"

By JOHN E. WEEKS, M.D.,
Surgeon at New York Eye and Ear Infirmary,
New York City.

The author divides trachoma into three stages. 1st. The early stage in which the granules are still discrete, the conjunctiva hypertrophied, secretion more or less profuse, cornea not affected. 2nd. In this stage the granules have coalesced to a greater or less extent. There is some cicatricial contraction of the conjunctiva with shortening of the palpebral fissure, the hardened sclerosed condition of the trachomatous tissue has by friction produced pannus and superficial or deep ulceration of the cornea, in many cases. The third stage is essentially one of atrophy of the conjunctiva with its accompanying conditions, pannus, ulcers and opacities of the cornea. The surgical treatment of the first and second stages were considered, based on the following indications for treatment. 1st. The obnoxious tissue should be removed if such a thing is possible without producing too much deformity of the lids. 2nd. The germs instrumental in the production of the disease should be destroyed, should any remain after the mechanical procedure. 3rd. The after treatment should be so conducted as to ultimately produce a smooth conjunctival surface.

The following was the treatment recommended for the first stage. In the first place the surface should be very superficially scarified, the lines of the incisions running parallel to the margin of the lid. The contents of the granules should then be expressed (the author prefers Noyes' forceps for this purpose) and a germicide in the form of a solution of bichloride of mercury 1-500 to 1-1000 should be introduced into the tissue by means of a tooth brush. The after treatment consists of preventing adhesions between the folds of the conjunctiva and of the application of antiseptic and astringent medication. The treatment advocated for the second stage is that known as "Grattage" an operation introduced by Darrier, in Abadie's Clinic, Paris. For the performance of the operation the author has devised a three bladed scarificator and a forceps. The operation consists in everting the lid by means of the forceps, scarifying the involved portion of the conjunctiva to two-thirds of the thickness of the trachomatous tissue, and scrubbing the surface with a tooth brush which carries a solution of the bichloride of mercury 1-500. A canthoplasty is done if the palpebral fissure is short. The after treatment which consists of the use of antiseptics and astringents be continued until the lids assume a smooth surface, from three weeks to as many months.

The following conclusions were arrived at:

In the first stage of trachoma the most efficient mode for treatment is superficial scarification with expression and the use of a germicide solution introduced by means of brush

In the second stage, if surgical interference is advisable, "grattage" combined with expression in some cases, canthotomy or canthoplasty, if necessary, gives the most satisfactory results.

The operations above advised convert a contagious into a non-contagious condition.

ABSTRACT OF A PAPER ON

"ORBITAL AND OCULAR GROWTHS,"

Report of Four Cases with Twenty-two Photomicrographic Illustrations.

By JOSEPH A. WHITE, A.M., M.D.,
Senior Surgeon to the Richmond, (Va.) Eye, Ear,
Throat and Nose Infirmary.
AND WM. M. GRAY, M.D.,
Pathologist to the Army Medical Museum, Washington, D. C.

The Pathology and Illustrations were Contributed by Dr. Gray.

Dr. White reported four interesting cases from his clinic at the Richmond (Va.) Eye Infirmary, operated on since January, 1892, two by himself and two by Dr. John Dunn, the Chief of Clinic at the Infirmary. The first was an intraocular growth, melanotic sarcoma of the choroid, originating in the ciliary body between the superior and external recti, and extending backward in the eye towards the nerve, which was severed three quarters of an inch behind the eye. This case was also illustrated by eight photomicrographic plates, beautifully demonstrating the nature and direction of the growth.

The other three cases were extra-ocular, one a sarcoma of the orbit originating in the sub conjunctival tissue of the lower cul-de-sac, and projecting outward. Whilst not intimately connected with the eye-ball, the latter had to be removed to get the tumor out. This was illustrated by four plates.

Another was a case of recurrent fibroid of the orbit, extending from the inner and lower orbital edge back to the sphenoidal fissure. The eye which was perfectly good, had to be scarificed to enucleate the growth, which was only partially successful, as it seemed to pass into the sphenoidal fissure. Five illustrations accompanied this report.

The last case was one of special interest being a tuberculous tumor of the orbit in a healthy girl, only 16 years of age. It was attached to the outer and lower orbital edge, extending backwards behind the eye. It was removed with preservation of the eye, and seemingly in its entirety, being enucleated after freeing its attachments at the orbital edge by the scalpel handle and finger.

It was shaped like a compressed pear, about an inch long, and three quarters of an inch wide at its base, tapering to a point with a long cord-like projection where the stem should be. Examination showed it to closely resemble miliary tuberculosis, if not identical with it, as demonstrated by the six accompanying plates. The rarity of this kind of orbital tumor and its development in a young and otherwise healthy girl gave special interest to this case. Dr. White paid Dr. Gray a high compliment for his superb work in the illustrations, and for his minute and accurate pathological report.

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SYNOPSIS OF A PAPER ON

"INJURIES OF THE EYE,"

By T. E. MURRELL, M.D.

LITTLE ROCK, ARK.,

The difficulty of foretelling results in many recent injuries to an eye, both as to the eye injured and to the fellow eye.

The varied tolerance of eyes to injuries, and to the presence of foreign bodies.

The question of the introduction of mocrobes in traumatic inflammation, direct and sympathetic.

The probable chemical or other property of some bodies rendering them especially hurtful.

Sympathetic inflammation not in direct ratio to the extent of the injury, but dependant on various and uncertain causes, contrary often to generally accepted theories of transmission.

Conservatism in dealing with injuries dangerous, and permissable only under well defined rules.

Cases in illustration of the several points.

ABSTRACT OF A PAPER ON

"MONOCULAR DIPLOPIA,"

By DR. TILLEY.

CHICAGO, ILL.

Repeated the general features of a case which was reported by him in 1888, and continued the case. This patient who was also color blind recovered from both symptoms, but died about eighteen months later. He reported four other cases, all of them in young girls. In three of these cases the chief symptoms experienced were confined to the diplopia associated with a varying amount of asthenopia. From the fact that in all fatal cases followed by autopsies, lesions, generally extensive, were found in the brain, especially marked in the posterior region of the hemispheres, it was inferred that the lesion producing the phenomenon was cerebral and probably cortical.

From the demonstration of syphilis in the father in one case, the large amount of infantile mortality in the family of another, and extensive movement of the cervical glands in another it was suggested that hereditary syphilis was probably the prime cause of the lesion. The chief symptoms in all the severe and fatal cases were, great pain in the head, convulsions, severe vomiting and monocular diplopia. The author was disposed to accept the proposed theory by Professor Fontan, as temporarily satisfactory, namely, that the impressions produced on the retina divide at the chiasm and are appreciated by the cortex as two impressions, that in the normal condition these are fused by means of uniting nerve fibres, that when these uniting nerve fibres are interfered with monocular diplopia results.

ABSTRACT OF A PAPER ON
"ZONULAR ATROPHY OF THE CHOROID,"

By DR. TILLEY.
Chicago, Ill.

Patient was 66 years old. A great part of his life was spent as an English sailor—no specific history. A marked intermittent pulse associated with a certain regular irregularity. There was a history of Dupuytrens fingers in father and brother of patient, and much more marked development of the same in the patient. There is incipient capsular cataract in both eyes, and in the choroid of right eye an almost complete band of atrophy embracing the region of the macula, the widest part of the band being at the lowest part of the fundus, and the part which is the narrowest, and still posseses certain bridges of choroidal tissue, is the region opposite the optic disc. Subjective symptoms complained of, consist of blackish brown area of loss of vision in the centre of field, and extending upwards. In that region there is a continual whirl of colored sensations, the rotation being towards the nose. The island of tissue within the zone was apparently normal.

ABSTRACT OF A PAPER ON
"THE ETIOLOGICAL RELATION OF NASAL DISEASES TO AFFECTIONS OF THE EYES,"

By H. GRADLE, M.D.,
Chicago, Ill.

The proof that certain ocular affections are the consequence of nasal disease may be furnished in various ways.

1. We can observe the extension of nasal disease into the orbit and appendages of the eye.

2. We may find clinically certain eye diseases occurring so regularly in connection with nasal affections as to suggest the dependance of the former upon the latter.

3. We may be able to influence the course of eye diseases by nasal treatment.

American authors have dwelt mainly on eye *symptoms* of nasal origin, but there are besides actual eye diseases with visible lesions, the etiology of which must be sought in the nose. Nasal origin has been proven in the following instances:

I. Diseases of *the tear-passages* (in the majority of cases) besides mere reflex lachrymation.

II. Vascular disturbances of *the lids* varying from œdema to an erysipelatoid condition: certain cases of blepharitis.

III. *Conjunctival* congestion and indirectly chronic catarrh (of which nasal diseases are not the only cause), certain forms of acute conjunctivitis accompaning coryza.

IV. The dependance of some forms of *corneal disease* upon nasal disturbances is probable but not definitely proven. The author's experience refers to phylctenular diseases and to a sclerosing form of fascicular keratitis.

V. Some attacks of *iritis*.

VI. In ill-defined disease suggesting *glaucoma*, characterized by reduction of sight, visual field and accommodation with intraocular congestion.

VII. The *optic nerves* may become involved by extension of disease from the sphenoid sinus.

VIII. Some of the *peripheral forms* of *paralysis* of *ocular muscles*.

IX. Some *inflammatory* forms of *orbital* disease and some *orbital tumors* originate in diseases of the nose or accessory sinuses. *Exophthalmic goitre* has in a few rare instances been cured by intra-nasal treatment.

X. The most frequent ocular troubles of nasal origin are the *functional derangements* such as itching and burning of the lids, feeling of fullness or shooting pains and less commonally, aching. With these annoyances there may or may not be asthenopia. If present the latter depends generally on intra-ocular causes but cases of purely nasal origin also occur.

Other functional disturbances which can sometimes be traced to the nose as their starting point are fugitive scotoma, blepharospasm and chorea of the lids.

ABSTRACT OF A PAPER ON "EMBOLISM OF THE CENTRAL ARTERY OF THE RETINA, WITH THE REPORT OF THREE CASES,"

By G. E. de SCHWEINITZ, M. D.,

Philadelphia, Pa.

Dr. de Schweinitz described three cases of embolism of the central artery of the retina, in one of which he had the opportunity of studying the eyeground twenty minutes after the lodgment of the embolus. Under these circumstances the fog-like œdema of the retina was observed to begin simultaneously in a peripapillar haze and a smaller, somewhat more dense infiltration covering the macular region, the two being separated by a portion of comparatively unaffected retina. Gradually the two banks approached each other and the infiltration became general. In the lower temporal vein there was a moderately rapid circulation of blood which flowed toward the disc. Rapid and vigorous massage of the eyeball produced no effect upon the embolus and no material change in the ophthalmoscopic appearances. There was a primary complete dwindling of the entire arterial tree, followed seventeen hours after the lodgment of the embolus by an increase in the size of the arteries, with the single exception of the inferior tomporal artery, which remained thread-like. During this period there was faint return of light perception, which had previously been entirely abolished. This state of affairs continued for twelve days, when the vessels again shrank to mere threads and vision was obliterated. In the other two cases, one studied five months after the accident and the other fifteen hours after the obstruction to the circulation, there was preservation of a small portion of the field of vision on the temporal side, in spite of the apparent complete obliteration of the central artery. In the one case form-sense was preserved in this area upon the temporal side, and in the other case only light-sense. In neither of the cases was a cilio-retinal vessel present. In the case studied fifteen hours after occlusion the inferior temporal artery carried blood very dark in color; it was beaded and resembled a vein. The reporter discussed the differential diagnosis between complete and partial embolism, and touched upon some points of difference between thrombosis and embolism of the central artery.

ABSTRACT OF A PAPER ON

"EMBOLISM OF THE CENTRAL ARTERY OR THROMBOSIS (?)"

With Report of a Case by

S. C. AYRES, M.D., Cincinnati, Ohio.

Dr. Ayres, after reviewing the literature on the subject, reported a case of sudden and almost total blindness coming on in a man thirty-three years of age. The entire field of vision was obliterated except in a section-like space below, in which he could count fingers at two feet. There was œdema of the retina around the macula, which was cherry red but there was no alteration in the veins or arteries. In four days central vision was restored and the scotoma slowly disappeared from below upward on both sides. When last seen there still remained an obscuration in the upper field. In a week the œdema of the retina disappeared and in two weeks the cherry red color of the macula.

Could indulgence in tobacco and stimulants cause this alteration, or was it thrombosis of the third degree as described by Michel?

* * *

ABSTRACT OF A PAPER ON

"A METHOD OF INFECTION, TREATMENT AND PROPHYLAXIS OF PURULENT OPHTHALMIA,"

By G. M. GOULD, M.D.,

Philadelphia, Pa.

He called attention to two striking facts in the treatment of purulent conjunctivitis, consisting in the great obstinacy of the disease to all methods of treatment, and despite isolation of the good eye, implication of this eye in the pathological condition. He believed that one explanation of these two characteristic features consists in the role played by the nose and lachyrmal excretory apparatus as transferring agents and hiding-places of the specific germs. The patient, may be, often transfers the toxic matter to the nose (nose-picking), whence it ascends through the duct and sac to the eye: or the germs may find their way from one diseased eye through the ducts and nasal passages to the other sound eye.

The canaliculi, sac and duct, not having been rendered aseptic, serve as a breeding ground for the germs which are constantly erupting through the punctum, thus setting up continually fresh infection of the eye.

The treatment suggested consists in slitting the canaliculi, cleansing and antisepticising the latter, together with the sac, duct and nose, as thoroughly as the eye itself.

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ABSTRACT OF A PAPER ON

"DOUBLE CONGENITAL DISLOCATION OF THE LENS (ECTOPIA LENTIS CONGENITALIS),"

Report of a Case by

GEORGE FRIEBIS, M.D., Philadelphia, Pa.

Symmetrical: occuring in a lad æt. 7: with cut illustrating the abnormal position of the lenses which were dislocated upward and inward. With brief comments upon the literature of the subject. His own view favoring the theory of heredity as the most essential factor in the causation of the malformation.

DISCUSSION.

Dr. C. Bryant:—This paper has been of considerable interest to me, from the fact that I have had during the past year, two families under my observation, in one of which five children out of seven had this trouble, both parents having normal eyes.

In the second family there were four members, three children and the mother, unfortunate enough to be subjects of this congenital malformation. All of these cases were amblyopic and vision could not be improved with glasses.

Dr. RANDALL :—Cited a couple of cases seen in Jaeger's clinic in 1883, in one of which, the displacement of both lenses up and in, it was regarded by Jaeger as congenital; while the other case, showing displacement up and to the left in both eyes, was held to be probably due to traumatism in part. He asked if any data bearing upon the matter were within the experience of the members.

Dr. E. P. MORROW :—I am glad to hear the conclusions reached by Dr. Friebis, regarding the importance of heredity as an etiological factor in ectopia lentis, as it agrees with my observation and study upon the subject. About two years ago, I saw four cases in one family and the history of another member of the same family similarly affected. The first case was a boy twelve years of age, with dislocation upward and inward in both eyes, later two sisters were seen, and again the boy's mother showed the same condition, giving also a history of her sister having a condition like her own. The cases were all identical, lenses dislocated upward and inward, iris tremulous, lense immovable, and all accepted either a convex or concave lens with improvement of vision.

Dr. SMITH :—Said in regard to voluntary ectropia Lentis as follows: Mr. Hodges, Detroit, can tip his head forward and permit the lens of each eye to drop into the anterior chamber, falling through the pupil, which can be seen to contract behind the lens. The lenses are clear, but the suspensory ligament must be abnormally long.

Myotics hold the lenses in position.

ABSTRACT OF A PAPER ON

"CLINICAL HISTORY OF A CASE OF SUCCESSFUL EXTRACTION OF A PIECE OF STEEL FROM AN IRIS AND LENS BY AN IRIDECTOMY, WITH SUBSEQUENT ABSORPTION OF THE LENS SUBSTANCE AND RECOVERY OF NORMAL VISION,"

By CHARLES A. OLIVER, M. D.,

Attending Surgeon to Wills' Eye Hospital, Ophthalmic Surgeon to the Presbyterian Hospital, etc., Philadelphia.

On the second of March, 1891, a twenty-nine year old male had a piece of steel imbedded in the upper inner quadrant of the iris and lens, causing a localized iritis and lenticular swelling. Two days after the accident, the foreign body and an area of inflamed and bruised iris tissue were removed by an iridectomy, the underlying lens showing the point of the ruptured capsule, and the position of the greatest amount of lens swelling and opacity. By the after employment of atropine, a light pressure bandage, rest in bed, and the internal administration of small doses of calomel, the wound rapidly healed and the inflammatory symptoms subsided. In one month's time, the lens matter, except a few capsular folds, which can only be seen during pupillary dilatation, had disappeared, the eye being quiet, and vision brought to normal by a proper correcting lens. At present, fifteen months after the accident, there is a perfectly quiet eye with a norrow coloboma up and in ; and eye which possesses normal acuity of vision with a + 11. D. s. ⊂⊃ + 0. 50 D. c. ax. 100.°

The case is interesting upon account of the immediate curative effects of an iridectomy which removed an offending substance, and its bed of bruised and inflamed iris tissue, thus allowing a free rapid swelling and disintegration of lens matter to uninterruptedly take place; this immediate happy result being supplemented by a subsequent restoration of vision to full acuity, with but little necessary correction of astigmatism in a comfortable and unirritated organ.

ABSTRACT OF A PAPER ON

"TUMOR OF THE CORNEA,"

By J. G. CARPENTER, M.D.,

Stanford, Ky.

B., aged fifty-five years, laborer; general health good as far as is known; has no inherited dyscrasia nor syphilis; "had an itching and burning sensation on the right eye-ball, thinking there was dust or wild hairs in the eye." On inspection in the mirror he noticed a reddish-brown deposit on the margin of the cornea. This increased day by day rapidly. In two weeks the sight was out. In a month the tumor was the size of a walnut, was quite vascular, bled freely on slight touch, was very painful, and the least rotation caused intense pain, as well as exposure to the sun or air. To the touch it was tense, irregular, and elastic; the color increased to a dark-brown or blackish-brown, the general surface nodular or lobulated. The tumor projected far between the lids on the cheek. Three weeks after its appearance the upper eye-lid took on the same morbid action and was confined to one fourth inch from the margin of lid from inner to outer canthus. The pain was intense, except when under the influence of morphine or cocaine locally. In thirty days after appearance of tumor sympathetic irritation and inflammation was manifested in the left eye, attended by profuse lachrymation, burning and scalding of eye, redness, photophobia, sight impaired, ciliary neuralgia. Pain increased on exposure to light or air. The proper treatment indicated was enucleation of the right eye and removal of growth from, or amputation of, right upper lid, to which the patient consented. Chloride-of-zinc paste was then applied. In two weeks the wound had healed, the sympathetic disturbance subsided in left eye, and vision was thoroughly restored. The specimen was destroyed by the office boy before a microscopic section was made. The age of patient, short duration of the growth, the color, the pain, hemorrhagic tendency, and its irregular, lobulated exterior are highly indicative of a melano-carcinoma.

GONORRHŒAL OPHTHALMIA THROUGH INFECTION BY MEDIUM OF AN ARTIFICIAL EYE.

Written for the Ophthalmic Record

By H. V. WÜRDEMANN, M.D.,

Milwaukee, Wis.

Dr. Morton's report of a case of gonorrhœal ophthalmia in the July number of the *Ophthalmic Record*, in which the infectious material had been conveyed to a globeless orbit through the medium of an artificial eye, recalls the following, in which the contagion was communicated in a similar manner, and which is also interesting from the result of operative treatment in an apparently hopeless case :

July 30th, 1890 : N.M., male, æt. 27, of powerful physique. Had been drinking hard for some weeks. Had several attacks of gonorrhœa before. About five years ago the left eye had been enucleated after an accident to the globe, and since that time he had been wearing a shell. Three weeks before he had an urethral discharge which soon bloomed out into a severe gonorrhœa. Being in a condition of obfuscation most of the time, the trouble was neglected, and he did not keep his hands clean although warned of the neccessity by a physician to whom he had applied for treatment. In this manner by means of the artificial eye, he inoculated the socket on the sightless side. This condition went on for a few days, during which he had no medical advice and in fact did not think it at all serious. Five days before I saw him, during the night some of the discharge from the eyeless side ran over into the right eye and was followed by inflammation. A poultice of tea-leaves was then applied by the family but no medical advice sought until I was called. I found pus streaming from both sides, the conjunctiva being greatly chemosed, that of the left orbit extruding in a mass between the lids. The lower half of the cornea in the remaining eye was one large ulcer, and perforation had already taken place near the upper margin. I sent the man to the hospital, put on ice water apparatus (Leiter's), placed leeches on temples, did canthotomy and had local applications of sublimate and atropine made Vaseline was kept between and on the lids, and silver solutions used later. This was a very severe gonorrheal inflammation and did not subside until the tenth week, during which he was in bed in the hospital ward. Dr. Hayes took charge of the urethral trouble and said that this was very obstinate. The patient became emaciated during his stay in the hospital but fattened up rapidly after the urethral and ocular inflammations had subsided. His resultant vision was *nil*, as the cicatrix of the ulcer occupied nearly the lower half of the cornea and the upper portion was likewise opaque. He could, however, tell the direction of a light when within a foot of his face. In October of this year he was admitted to the State institution for the blind at Janesville, and while there learned the trade of basket weaving. In September 1891 he called upon me, and on examination I found that a small portion of the cornea in the upper part appeared clearer than I remembered to have seen it; and as he was very importunate told him that an operation might be done which would perhaps give him a little more light.

He decided to attempt the experiment, and Sept. 17th, 1891, I made an upward iridectomy preparatory to removal of a supposed cataractuous lens and perhaps to transplantation of cornea. He claimed to have seen my face after the operation, and sure enough, the outlines of the new pupil could be faintly made out. On September 27th, he could count fingers when the hand was held close to the face and the cornea afterwards cleared rapidly. A little later I tenotomized the superior rectus, which turned the eye downward and permitted of easier vision. The eye was treated several times a week by massage with Pagenstecher's ointment, calomel or boric acid, with result, after ten months, of clearing all that portion of the cornea which had not been directly involved in the cicatricial process. The new pupil was widened by a subsequent operation, as the cornea over the site of the first operation was not as clear as that a little on the side. The eyeball was much flattened, and accordingly I gave him a glass of plus. 7.00. D. sph. with which his vision now equals the counting of fingers at four meters, and by the letter test is $\frac{1}{36}$. The lens is transparent. The cornea is highly irregularly astigmatic and although reasonably clear I do not expect, on account of this factor, to acquire better vision.

The leucoma left after gonorrhœal ulceration of the cornea frequently proves, as in this case, quite tractable to treatment and often clears much more than would be expected from the extent and depth of the ulceration.

805 Grand Ave.

THE BEST METHOD OF TESTING FOR ERRORS OF REFRACTION AND SOME PECULIAR CASES OF ASTIGMATISM.

Written for the Ophthalmic Record by

W. CHEATHAM, M.D.,

Professor of Diseases of the Eye, Ear, Throat and Nose,
Louisville Medical College.

In the last few years some peculiar cases of astigmatism have come under my observation. Just here, I will state, that atropia sulph., in my opinion, is the most safe, and the most reliable mydriatic to use in testing refraction. By saying it is the most safe, I mean that it produces less local irritation, and is less liable than Daturia and similar drugs to produce constitutional effects. I gave Daturia a trial several years ago and had to give its use up, on account of frequent poisoning. I have tried the homatropia and cocaine discs, and other combinations but have returned to the use of atropia sulph. I have gelatine discs of eserine, and same of atropia sulph. $\frac{1}{20000}$, I bought of Saverg & Moore, in London, in 1878; so such discs are not new. I find it difficult in many cases to paralyze the accommodation even with atropia. I depend upon the ophthalmoscope in many cases to tell whether or not there is complete paralysis of accommodation. I find some few cases in which the ophthalmoscope shows hypermetropia to such a degree that no mistake can be made, yet under the continued use of atropia sulph. gr. iv. to aqua. ℥ i without, and combined with, cocaine, and other mydriatics, and even after leeching the temples, the spasm persists, and in an occasional case there is even some play of accommodation. I have found accommodation active enough in people 50 years of age to necessitate the use of a mydriatic, in testing refraction.

I examined several years ago Mr. J. H. L a banker 52 years of age, who had a manifest hypermetropia of 1,50 D. who could read Jaeger No. 1 perfectly with no glass; 1.50 may have been his total. Atropia sulp. then in my opinion is the most reliable mydriatic, less liable to cause constitutional trouble, if pressure is made on the tear sac and canalicule for two minutes after it is dropped into the eye: I again prefer atropia sulph. to homatropia, because in most cases with refractive errors, I want them to rest the eyes for a week or ten days. I find but little trouble in getting them to submit to the use of atropia sulph. when I tell them that I will not examine them unless they use the drops. As for the Javal, the Leray & Dubois, and similar instruments, unless they are much improved upon, they will soon be laid aside as worthless. I find no method for testing refraction as reliable as the test cards and lenses.

Miss S. age 20, came to see me some time ago, complaining of headache, and pain in lids and eye-balls on use of eyes. She had slight conjunctivitis. V. R. = $\frac{20}{30}$ — with + .50 D. c. axis 180°. V. L. = $\frac{20}{30}$ with + .50 D. c. axis 90°: under atropia, V. R. = $\frac{20}{20}$ with + .50 D. c. axis 180°. V. L. = $\frac{20}{20}$ C. + .50 D c. axis 90°. This is a case of + astigmatism with axis in right eye against the rule, and with the rule in the left. I have seen several similar cases, and two cases of myopic astigmatism with the axes as above.

May 23, '91, Mrs. E M. G. age 30, consulted me concerning numerous large chalazia, of both lids of each eye. As I always do in such cases, I tested her vision and found it $\frac{20}{100}$ each eye. I made no test of refraction but ordered the use of atropia sulph.; after several days use, there being some difficulty in getting her eyes under its influence, I found V. R. = $\frac{20}{20}$ with + 1.25 D. ⊂ + 1.50 D. c. axis 90°. V. L. = $\frac{20}{30}$ with + 1. D. ⊂ + 1.50 D. c. axis 90°. I ordered her R. + 1. D. ⊂ + 1.50 D. c. axis 90°. L. + .75 D. ⊂ + 1.50 D. c. axis 90° for constant use. I then opened and curetted the chalazia. She came to see me the following October, saying the tumors had not returned, but that she had never been able to use her glasses with any comfort, for either close or distant vision. I again ordered the atropia, and found after keeping her under its influence for several days, that she could see nothing scarcely at the distance, with the glasses I had ordered, but that now V. R. = $\frac{20}{20}$ with + 2 75 D s; and V. L. = $\frac{20}{40}$. + 2.50 D. s. I look upon this case as one of simple hypermetropia, with a total error in R. of 2.75 D. and in left of 2.50 D. transferred into compound hypermetropic astigmatism of a total of 2 75 R. and 2.50 left by means of pressure of the large chalazia, upon the globe.

SPASM OF THE ACCOMMODATION UNRELIEVED BY ATROPINE SULPHATE.

Report of case, by
C. R. GARDNER, C. E., M. D.,
Ophthalmic Surgeon to Dickinson Hospital,
NORTHAMPTON, MASS.

The following case may be of interest, as it seems to prove, that atropine sulphate, used a reasonable length of time, is sometimes a disappointment to the oculist in its practical results.

It has been a routine practice with the writer, to examine every case of refraction, with the direct image of the ophthalmoscope and to verify the result, by use of atropine sulphate, in all young people where consent could be gained. Several thousand examinations, thus recorded, enable me to rely usually on my results, as approximately correct. I am hypermetropic

+ 0.75 D. s. and do not completely relax my accommodation. Experience, and comparison with others, led me formerly to add + 1.5 D. s. to the lens used in the ophthalmoscope; but at present, I find + 1. D. s. or + 1.25 D. s. nearer correct, as the constant factor to be used

The final results seldom vary more than + 0.75 D. s. from the correct result in at least one meridian of the eye. The lens used in the ophthalmoscope, is that one that gives the clearest definition to the retinal stipling and minute vessels, in the neighborhood of the macula lutea. In the case now reported I saw the details clearly with a — 0.5 D. s: and expected by adding + 1.25 D. s., to obtain an approximately correct result of + 0.75 D. s; but the use of atropine sulphate failed to accomplish such a result; although a four per cent solution was applied, one drop to each eye, and repeated in five minutes, three times daily, for four weeks.

May 28, '90. Miss B. E. S., age 20, student, subjective symptoms, headache, asthenopia, blurred distant vision.

Vision O. D. $\frac{20}{70}$ without lenses, $\frac{20}{20}$ with — 1.75 D. s.

Vision O. S. $\frac{20}{70}$ without lenses, $\frac{20}{20}$ with — 1.75 D. s.

Exophoria 7°. Oph.: — 0.5 D. s. + constant factor + 1.25, = + 0.75 D. s.

Atropia Sulph. 4% sol. 1 gtt. three times a day.

May 29, '90. Vision O. D. $\frac{20}{20}$ with — 1.5 D. s. ⊂ — 0.25 D. c. 90°. Vision O. S. $\frac{20}{20}$ with — 1.5 D. s.

Esophoria 7° latent. R. Atropine sulphate for three days.

June 2, '90. Vision O. D. $\frac{20}{20}$, with — 1.25 D. s. ⊂ — 0.25 D. c. 90°. Vision O. S. $\frac{20}{20}$, with — 1.25 D. s. ⊂ — 0.5 D. c. 90°.

Esophoria 2°. ℞. Atropine sulphate for one week.

June 9, '90. Vision O. D. $\frac{20}{20}$, with — 1.25 D. s. ⊂ — 0.25 D. c. 90°. Vision O. S. $\frac{20}{20}$, with — 1.25 D. s. ⊂ — 0.5 D. c. 90°.

No muscular trouble manifest.

June 26, '90. Vision O. D. $\frac{20}{20}$, with — 1.25 D. s. ⊂ — 0.5 D. c. 60°. Vision O. S. $\frac{20}{20}$, with — 1.25 D. s. ⊂ — 0.5 D. c. 120°.

No manifest muscular trouble.

Abduction 11°, Adduction 11°, Sursumduction 2°. Deorsumduction 2°. The ophthalmoscope at each examination gave the same result as at first visit. The above lenses were ordered for the patient with directions to use them only when absolutely necessary; and the advice given to avoid as far as possible all close work, and to report before the college term opened in the fall.

Sept. 4, '90. Ophthalmoscope gave the same result. — 0.5 D. s. + constant factor + 1·25 D. s. = + 0.75 D. s.

No muscular trouble manifest.

Vision $\frac{20}{20}$, O. D. with — 0.5 D. s.

Vision $\frac{20}{20}$, O. S. with — 0.5 D. s.

The above lenses were ordered for distant use only. The rest afforded her eyes during July and August, seemed to have accomplished more for the patient, than the use of atropine sulphate. Several other cases have failed to give me satisfactory results, where this remedy was used in like manner.

Is there any plausible explanation of the results in this case?

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621½ Church St,, Nashville, Tenn.

A FEW DAYS LATE.

This issue of the *Record* is a few days late, due to the fact that the Editor took his vacation in August, spending almost the entire month in Denver, Salt Lake City and San Francisco.

SAN FRANCISCO.

While in San Francisco we found Drs. Voorhies, Barkan, Powers, O'Toole, Hopkins and others fully alive to the interests of ophthalmology. We learned that a city Ophthalmological Society had been organized with prospects that the regular meetings will be full of interest. Dr. Hopkins, Sec'ty., promises to give to the readers of the *Record* occasional reports of proceedings.

DENVER,

This is a beautiful city of about 150,000 inhabitants, a good proportion of whom are Doctors, judging from the signs seen as one walks leisurely along the streets. There seems to be a greater number of Oculists than a city of that size would be expected to support There are about twenty or twenty-five regulars and more than half as many irregulars engaged in the practice of Ophthalmology and Otology. But notwithstanding this, Drs. Rivers, Coover, Foster, LaMond and others were found to be busy practitioners The readers of the *Record* may expect some interesting communications from the West soon.

DR. LANDOLT ON CATARACT.

Complying with Dr. Landolt's wish we will make the next issue of the *Record* a double number (October and November), and will bring same out as early in October as possible. About 60 pages will be occupied by Dr. Landolt's paper, every line of which will be read with interest by our many readers. The work of translation by Dr. C. M. Culver, of Albany, N. Y., is progressing nicely.

If any one of our subscribers should chance to meet a non-subscriber he will confer a favor on him by speaking to him about Dr. Landolt's paper which will appear in English in the *Record* only. This paper alone will be worth far more than the cost of a year's subscription.

QUESTIONS AND ANSWERS.

We propose giving space for Questions and Answers in subsequent issues, believing that it will be profitable to our readers. Questions will be numbered in the order of their receipt, and the answers will have the corresponding number. It is not the purpose of the Editor to do all the answering—he will look to his subscribers for most if not all the answers. Both the name of the questioner and of him who answers will appear.

Department of Otology, Laryngology and Rhinology.

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NASHVILLE, TENN.

Continuation of the SCIENTIFIC PROCEEDINGS OF THE Section of Laryngology and Otology of the A. M. A., at the Detroit Meeting, June, 1892.

ABSTRACT OF A PAPER ON

"UVULOTOMY,"

BY CARL H. VON KLEIN, A.M., M.D.,
CLEVELAND, OHIO.

Taking under consideration all the modern inventions of uvulatomes, and the various methods by which the excisions of the uvula is made, none appear to have a method or instrument with which the uvula can be operated on, so the uvula can produce its functions in all its physiological intentions and purposes, the same as in a normal condition.

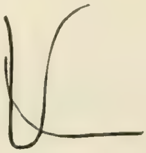
To the people in common it matters not how the amputation is performed as long as it is not cut off too much and the tickling in the throat has ceased. But to the professional man of voice culture, to the singer, and the elocutionist, it is a vast difference, as upon the organs of the throat they depend mainly for the continuance of a livelihood, the same as the laborer depends upon his hands. Especially the singer who exhibits, under the most critical observation, upon which his entire reputation may rest.

A singer with a defective uvula will always exhibit a falsetto. The voice and its degrees of pitch may be accurately executed by the individual, notwithstanding the deformity; yet the upper notes are too variable under the accidental influence of muscular effort, caused by faulty mechanism, hence there is not produced a fixed and accurate tone, for when any degree of pitch is attempted, the uvula being imperfect, prevents the normal relations of the parts thus impairing the tone of the voice.

The change in the palate consists in a convulsive action of the uvula which can not be performed with one that is stumpy.

Again, a stumpy uvula cannot perform the functions of lubricating the soft palate and its kindred organs.

An excision of the uvula once performed can be recognized during man's existence, the same as in an amputated finger. When he opens his mouth and makes the sound "oh" the stamp contracts and forms a concave bottom. To overcome the old method, Dr. von Klein, devised curved scissors which cuts the uvula, beginning at the front and going upwards and backwards, leaving it delicate and pointed at the tip with which a vocalist can perform all the functions of the uvula as though the excision had not been made.



The above cut heals much quicker than a cut with ordinary scissors, as the food passing by does not come in contact with the cut surface, nor does the cut surface rub on the tongue when speaking. Dr. von Klein's method of operation is to take hold at the end of the uvula with a long forcep, stretch it downward, outwards and cut at the place where first focussed

When the excision is thus made the uvula contracts and the operation is made bloodless, as though it was ligated.

ABSTRACT OF A PAPER ON

"MENTAL ABERATION ATTENDING HYPERTROPHIC RHINITIS, WITH SUB-ACUTE OTITIS MEDIA."

BY J. G. CARPENTER, M.D., STANFORD, KY.

President Central Kentucky Medical Society, Fellow and Organizer
American Rhinologic Association, Member Ky. State Medical Society,
Member Miss. Valley Medical Society,
Permanent Member American Medical Association.

Mental aberation attending intra-nasal affections and their sequelæ is considered rare by the profession, yet it has been the experience and obervation of many of the Fellows of the American Rhinological Association, that mental aberation, or if insanity *per-se* has appeared upon the existing intra nasal disease, then removal of the latter often causes the former to subside.

Roosa gives in his valuable book on Diseases of the Ear, a case of insanity and suicide on account of tinnitus aurium.

Experienced rhinologists can recall one or more cases of mental aberation due to intra nasal disease. In fact, so much importance is attached to disease of the upper air passages, being the *fons et origo* of mental aberation that a committee was appointed on motion of Dr. T. F. Rumbold, St. Louis, Mo., now of San Francisco, Cal., consisting of Fellows of the American Rhinological Association, to examine inmates of State Insane Asylums and ascertain the per cent of patients affected with diseases of upper air passages.

While consent has been given by the superintendents to make the rhino-pharyngoscopic examinations the committee has not yet reported, owing to the difficulty in getting the insane to submit to the necessary investigation.

It has been the common experience of practical and experienced rhinologist's to almost daily have patients with impaired intellectuality, the mind going into vacuity, the lawyer loosing the thread of argument, the accountant making egregious blunders in his addition, another unable to concentrate his mind, to read an interesting chapter or column or carry on a spirited conversation, another will hear an interesting discourse or enjoy a thrilling article yet unable to give the salient points presented, are neglectful, absent minded. A prominent farmer in settling with his tenants made numerous blunders, making mistakes in dollars and cents as often against as for self, is sad, despondent, melancholic thinks he is loosing his mind. A prominent merchant often fails to charge "mdse." sold, or re-charges the second or third time, or fails to enter the credits, is not dishonest and suffers much mortification on finding the stupendious errors; is irritable, easily insulted, has presentiment of sudden death, feels that he is loosing his mind, is quite emotional.

A young lady of good social position, thinks herself unclean, unfit to keep company with mother, sisters, sees numerous imaginary unclean spots on her dress and clothing, is morose, seeks solitude, is melancholic, "says she will be lost on account of her sins," is often found walking the porch or kitchen in night clothes, in mid-winter, or wandering in this semi-nude state out in the yard, she had been formerly quite anæmic, had retroversion and catarrhal endometritis, and with proper treatment the later was cured but the mental aberation continued and was cured by treatment, directed to the naso-pharynx and galvanization. Another patient, married lady, with chronic rhinitis, becomes intensely sick, excited, emotional, and has fear of impending death, sheds tears freely on going to church or to any public gathering, is dispondent and seeks solitude. Treatment directed to the upper air passages and galvanism effect a cure. Another patient, a maiden, has been afflicted with symptoms enumerated in the last case, is afraid to be left alone, sleep by herself, or sleeps in a dark room: at night keeps the lamp burning brightly, the window shutters open, the window curtains up so that she may see any burglars who might chance to disturb her quietude. She has insomnia, has the most intense aversion to her family, afraid of her uncles and aunts, seeks solitude, will not be seen by friends or strangers, has constant presentiment of death and other evil omen. Only through force will she leave her house, has violent head aches, highly emotional, brings forth tears in abundance, is suspicious of mother and sister, has many delusions. Treatment directed to upper air passages, nerve tonics, galvanism and proper attention to retroversion effected a cure.

Mrs.——, age 35 years, former health good, family history excellent, has had hypertrophic rhinitis for years, nasal occlusion; though a woman of strong mind and body, is quite emotional, subjected to any great excitement or bad news develops the tetanoid state, is given to frequent shedding of tears, seeks solitude, is melancholic, is restored to health by cauterizing the turbinated bodies (lower and middle). In 24 hours amelioration of her mental condition is perceptible to her family and friends, restoration to health is quickly accomplished.

Mr.——, age 25 years, has naso-pharyngeal catarrh and aural catarrh, with tinnitus aurium and deafness, acquired irritability of temper, melancholia, partial loss of memory, inability to think any length of time on one subject, has either frontal or occipital headache all the time; has insomnia, agoraphobia and anæsthesia of the skin; has ocular catarrh and asthenopia and neuralgia in different parts of the body; tuning fork heard best in left ear, drumheads slightly opaque and without polish. Hearing S. A., 6 inches; D. A, 18 inches. This is a case of extreme neurasthenia. Patient has been, on account of the above conditions tempted to commit suicide and will not remain alone night nor day, says he will kill himself if left alone and can't help it, is deluded.

Mrs. R., age 40 years, has been affected with intra-nasal disease about fifteen years, the time dates to an attack of acute rhinitis during the influenza, 1872. There were extensive hypertrophy of the lower and middle tubinated processes, marked nasal stenosis causing pressure. Symptoms, headache both occipital frontal, patient seeks solitude, is melancholic, wants to stay at home all the time. Though she has a lovely home and earthly blessings, her sadness and dispondency last, sheds tears without provocation, is not in feeling and disposition her former self. Cauterizing the turbinated bodies and other local treatment, with a blood and nerve tonic, effect a cure.

Mr. H., age about 40 years, farmer, family history good, general health excellent, excepting the affection in upper air passages. Though he has been a hard worker and able to transact business, his health, for the last year or two has been greatly impaired, he feels languid, indifferent, tired, is loosing interest in business, has nasal stenosis, is a mouth breather, has an oppressed full sensation in the naso-orbital regions, constant headache, greatly aggravated by colds, sudden changes in weather and hot sun, dislikes to be in company, seeks solitude, is melancholic, irritable, pevish, morose, has an indifferent, stolid and insane expression, has constant pains in various regions of body, at times increased in severity.

In the spring of '91, his symptoms for worse were increasing, he sought no professional advice, but tried to work or wear off his indisposition, he went to the field to plow, had a violent headache, stopped plowing for a while and lay down on the ground, from this time has no recollection of what transpired. For days, he failed to come home, left horse in the plow. Family and neighbors institute a search but Mr.——, could not be found. A nephew was in the city of Lexington, and saw Mr.——, on the street in his shirt sleves and old working cloths. Mr.——, could give no account of himself, did not know where he was, how or when he came to that city, nor on what business, "said he had a bad headache and lay down in the field." He was aimlessly wandering over the city, speaking to no one and like the wandering Jew, finding no rest but continually passing on, virtually was lost to himself, family, friends and surroundings. His nephew brought him home, he does not sleep well, appetite capricious, is very weak, nervous, "says his head (forehead) and left half of head hurt terrible bad, that the left half of head throbs all the time. A rhinoscopic examination reveals a naso-pharyngitis, hypertrophy of the lower and middle turbinated bodies, nasal stenosis, the post nares and vault of pharynx is a purplish red and swollen angry appearance, coated with thick tenaceous inspissated mucous, great tumefaction. The left side of head is sensitive to touch, the tragus and mastoid and auditory canal show great pain and anguish on touch, the drum-head is bulging and highly congested, paracentitis is resorted to, the throbbing, pain, sensitiviness rapidly subside, the naso-pharyngeal chamber is sprayed and cleansed with a mild anteseptic wash and daily medicated for a week with mild soothing astringent non-irritant remedies, the conjestion and inflammation reduced to a minimum. Now the turbinates are cocained and cauterized, and the nasal stenosis relieved. In 72 hours, from latter treatment, the mental faculties begin to clear up, the clouds gradually pass away, patient is sprayed for three weeks with mild astringent anti- and a-septic soothing remedies and in a month is cured of all mental aberation. The nasal stenosis and enlarged turbinates have been removed and the lining of the naso pharyngeal chambers placed in a healthy state. Patient is restored to former health.

When we consider the pathological elements of the various forms of chronic catarrh, and, engrafted upon them, the very frequent or recurrent sub-acute naso-pharyngitis with increased dilitation of the blood vessels, hyperæmia, redness, heat, tumefaction and pain, followed by exudation of liquor sanguinis, diapodesis of the leucoytes, increased infiltration of the connective tissue, cell proliferation and organization of lymph, rhinoscopic examination showing a congested, red, dry, and swollen appearance of the mucous lining: later on, the dryness gives way to moisture and an abundant secretion of mucous or muco-pus: the mucous and sub-mucous tissue is œdematous, infiltrated, and thickened, and the glands and follicles are distended and abnormally active, and often added to this, the pressure of a polypus, septal spur, ridge, an exostosis, enchondroma, deflected septum and adenoid growth in the vault and fauces causing irritation and pressure, and producing irritation and inflammation by continuity, contiguity, and reflex irritation in distant organs and nerves: it is very easy to explain why mental aberration should attend long continued disease of the upper air passages, as well as other sequelæ.

About, or less than a decade ago, the rhinologist was considered to exist in name only—a myth—and not entitled to a foothold in the profession; but to-day rhinology has become one of the chief corner-stones of the Temple of Medicine and Surgery. It is built on physiological, histological and pathalogical rocks;

upon these, we, the Rhinologists, have builded our church. The gates of doubt, charlatanism, ridicule, and infidelity shall no longer prevail, and now, in this enlightened day, "*He who doubts is damned already.*" To the general practitioner, we say: Give the stomach, liver, heart and alimentary canal, and chest organs rest, and come up higher and see the light turned on, not through a glass darkly, but see new realms, diseases, and pathological lesions, for old things have passed away. Behold, a new creation!

To the gynecologist and genito-urinary surgeons, the rhinologists are ready to say through reflexes and neuroses, we met you, not only half way, but all the way. The intra nasal tissue is glandular, erectile, and has various nerves, blood, and lymph channels ramifying in it like the utero-genital organs, and on proper provocation, sends out reflex irritations and congestions to the spinal cord, brain and other remote organs.

To the alienists, say, look into the naso-pharyngeal chambers, and often a cause for insanity can be found. To the oculist, aurist, dentist, you must bow in reverence to rhinology, for your work is very often *nil*, unless you pay your respects to the rhinologist, for often he only can solve your difficulties, and cure your patients. The more frequently you consult him, the better it will be for humanity. To the surgeon, we say: You are indispensable.

The successful rhinologist, like the ideal gynecologist, must, from necessity, be a skillful and conservative surgeon.

Rhinology is a haven in which many mortals find rest, ease, surcease of sorrow, health, peace, joy, and long life.

ABSTRACT OF A PAPER ON

"INTUBATION TUBE WORN FOUR YEARS."

By F. E. WAXHAM, M.D.,

Chicago, Ill.

At the recent meeting of the American Medical Association, Dr. F. E. Waxham reported a case of papilloma of the larynx, unique on account of the complications, the length of time the tube was worn and the almost perfect comfort of the patient.

The history of the case indicated laryngeal obstruction due to a papilloma. The patient a boy, two and a half years old suffered an attack of measles at the age of one and a half years, during which time the cough was decidedly croupy, and the respiration somewhat embarrassed, but these symptoms disappeared Six months later the voice became hoarse, and finally whispering and at the same time dyspnœa occurred which gradually increased until at the age of two and a half years, intubation of the larynx became necessary in order to prevent death from suffocation. The operation was done in the hope that the introduction of the tube and subsequent pressure might destroy the growth. After wearing the tube six days it was removed. The patient was able to do without the tube for two weeks when the urgent dyspnœa returned, and it became necessary to reintroduce it. Three days later it was removed but the child could not live without it and it was at once replaced. On account of the early age of the patient a laryngeal examination was impossible, and removal of the growth by the intra laryngeal method impracticable, and as laryngotomy, at so early an age gave, in the great majority of cases unsatisfactory results, a new method was thought worthy of trial. The upper part of the tube was coated with collodion and this in turn with chromic acid, and then another layer of collodion. The tube thus prepared was introduced and left in position for a few days. Upon removal of the tube the child was still unable to breath and a second application of chromic acid was made in the same manner. As the operator had made previous arrangements for spending a few months in Europe, the patient was left in charge of another physician.

On account of some difficulty experienced in the removal of the tube, tracheotomy was performed. When the operator returned from abroad, the patient was found wearing the tracheotomy tube, to which the larynx was tightly sealed by adhesions. Even the smallest laryngeal sound could not be passed. Laryngotomy was performed, the adhesions cut away as far as possible, and the remants of the growth cauterized with nitrate of silver. The wound was closed and the smallest intubation tube introduced above the tracheotomy tube. From time to time the intubation tube was increased in diameter, and shortened so as to be worn in connection with the tracheotomy tube. For one year and a half the child wore both tubes with apparent comfort, at the end of which time, the tracheotomy tube was dispensed with. Until the present time the patient has worn the intubation tube, which gives much less discomfort than the tracheotomy tube and is changed on the average of once a month, but at times it has been worn continuously as long as two and even three months.

The patient is now able to breathe without the tube for several hours at a time, and it is hoped that as he grows older, and as the larynx increases in size, that he will be able to do without it entirely.

ABSTRACT OF A PAPER

"ON THE INFLUENCE OF CERTAIN DIATHETIC CONDITIONS UPON THE PROGNOSIS IN OPERATIONS UPON THE THROAT."

Read before the American Laryngological Association, at its fourteenth annual meeting, held in Boston, Mass., June 20, 21, 22, 1892.

By D. BRYSON DELAVAN, M.D.,

New York.

He called attention to the importance of discovering, before operations upon the throat, the possible existence of a diathetic condition which might influence the result of the operation, and described several such general conditions, including the strumous, the rheumatic, and the hemorrhagic diatheses, and the diseases exophthalmic goitre and general lymphadenoma. He concluded that in the case of the two last mentioned, the removal of enlarged tonsils and of adenoid hypertrophy at the vault of the pharynx was attended with no extraordinary risk.

With regard to the prognosis in strumous cases, complete removal of the offending tissue is more difficult, recovery after operation is somewhat slower, and recurrence more probable. In view of the latter, patients should be warned, in these cases, of the possible necessity for future operation. Still, the earlier such cases are operated upon, the better, and the results obtained are excellent.

In rheumatic cases, no especial difficulties are offered, and the prognosis as to the relief of recurrent acute attacks of inflammation of the throat is most brilliant.

The hemorrhagic diathesis is the most important because the most dangerous. Its presence contra-indicates all surgical interference. The only known accidents that have happened in this country in the removal of adenoid hypertrophy at the vault of the pharynx, have been in hæmophilic subjects. Adenoid enlargements are unusually common in these patients. There is no method of operating upon them, now known, that is safe. The galvano cautery is not a reliable hæmostatic even in ordinary cases, as bleeding may occur after its use, both immediate and secondary. It should not be relied upon, therefore, in the case of bleeders. The writer urges, 1st, that rigid examination as to the possible existence of the hemorrhagic diathesis be made, prior to operation upon the tonsils and adenoid tissue of the pharynx in every case; 2nd, that in the existence of hæmophilia, operation by any procedure at present known is absolutely contra-indicated; 3rd, that since many of these cases urgently require relief for their throat troubles, it is most desirable that a method of reaching them more satisfactory than any heretofore practiced, be suggested.

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CATARACT-OPERATION, IN OUR TIME.

BY E. LANDOLT, M.D.,
PARIS, FRANCE.

(Translation made, in compliance with the author's request, in part from
each of the French and German originals, and the author's
special corrections of each, by
C. M. CULVER, M.A., M.D.,
ALBANY, N. Y.)

Cataract-operation has, in all times, had a peculiar charm for surgeons.

Its purpose gives it, for the philanthropist, a leading rank in its class. The manual dexterity and accuracy of vision which it demands, will always assure it the sympathy of surgical adepts. To these may be added the fact that the eye is, for the surgeon, as well as for him who studies its physiology or pathology, a marvelous microcosm, admirably adapted to the study of such new methods as have, in recent times, caused such rapid and astonishing progress to be made, in surgery.

Nothing could be more natural, then, than to see this operation constitute, for men to whom this art specially belongs, the favorite subject of conversation, investigation and publication.

But, in the domain of publication, we meet recently not only contradictions that are disquieting, even for the best judges, but also assertions that are incontestably erroneous and calculated to mislead the inexperienced.

We would like, therefore, to try to establish the ideas upon so important a subject as cataract-operation, explain the differences of opinion between masters of equal right to authoritative utterance, and to let good sense speak in opposition to propositions that are as baleful as they are fantastic.

This attempt seems to us all the more indicated, at this time, because it affords an opportunity to give an account of the influence, upon cataract-operation, that has been exerted by antisepsis—which has inaugurated a new era, for surgery—and by cocaine, which some benevolent genius seems to have created expressly for our specialty.

In order to render our work the more fruitful and exempt from all appearance of prejudice, we have made sure of the collaboration of a large number of colleagues in all countries and of every age. Convinced that those whose voices are raised highest in the press and in sessions of the erudite societies, do not at all represent the opinion most generally entertained, and that those, to whom it would be best worth while to listen, the masters to whom great experience has long since demonstrated the best methods to follow, are silent, precisely because their way of doing seems to them neither new nor extraordinary; convinced, in a word, of the great utility of a general inquiry into our subject, we have permitted ourselves to address a circular-letter to a large number of our colleagues whose opinions were not known to us.

The benevolence of the welcome, with which that circular was received, has caused us the sincerest gratification. Only lack of time has prevented our personally thanking each of our correspondents for the courteous, interesting and instructive way in which they have kindly replied to our quest. Let them all now accept the expression of our deep and sincere gratitude! Their responses are of the highest value to us, and would constitute the most precious background for the history of ocular surgery, if it were practicable to publish them all

Those of our colleagues who have not received the circular-letter will excuse us for not having importuned them, in this connection. The opinions of many of them were known to us, from their publications. Of such opinions, as will be seen, we have rendered account, so far as the extent of this article has permitted. Moreover (as the colleagues will, doubtless, understand), it was hardly possible that all should be heard. We have been obliged to limit ourselves to a single representative of each of the different countries and schools; but I very sincerely hope that, nevertheless, each will find his opinion recorded in the following pages and that, thus, harmony among those who seek, with equal sincerity, what is right, will prevail.

When we speak of cataract-operation we mean to limit our subject to the method by extraction. Now it might be supposed that, Daviel having demonstrated the possibility of removing the crystalline by means of an incision made in the eye, and so many remarkable men having since devoted their attention to perfecting this operation, there ought, at present, to be no longer the least doubt as to the best method to use, in this undertaking.

However, such is not at all the case; the result of our inquiry is the best proof of the considerable differences of opinion, concerning this matter, which exist.

Before the question, as to how to do the operation, is reached, there seems to be a want of agreement as to what are the *indications* for it. And between those who, like Gayet, avoid "as much as possible, operating on unripe cataracts," or who find, with Sprague, that it is "bad surgery to extract immature cataracts," and those to whom operation on unripe cataracts gives "as good results as the extraction of ripe cataracts" (Fuchs, Hirschberg, Schweigger and many others) all possible opinions find themselves represented, and worthily so.

If we consider the operation, itself, we find that there is not a single detail of it which has not been a matter of controversy.

It is almost necessary to strain matters to secure unanimity on this single point, that the best location for the wound is the margin of the cornea, and that it ought to be greater than the cataract to which it is designed to give egress. But there the accord ceases.

Some incise above, some below. Those of one party make a conjunctival flap, those holding different views carefully avoid doing so. Some will perform, as a guarantee of the success of the extraction, an iridectomy, which others consider as more than superfluous.

For certain colleagues, the lens capsule will have been sufficiently opened only when they have removed a morsel of it by means of forceps; for the majority of operators it suffices that the capsule be cut, with a fine blade, or that it be torn, by means of a delicate point.

And when the cataract has been taken out of the eye, with what care does the one operator avoid entering the wound with any instrument whatever, preferring to attempt to remove the residue by massage alone, practised through the lids; while this other operator goes on to scour hardily the hyaloid sac free from the cortical masses that it still contains, using a spatula, and not even fearing to press them out with the aid of a strong curette. What is still more, the daring one may practise abundant washing of the anterior chamber, which many others consider as eminently dangerous.

How are we to explain this considerable divergence of views (concerning a subject that is, apparently, so simple) among equally competent men who are equally expert and sincere?

Must we conclude that our desire to reach an understanding, in this matter, is premature? Is the extraction of cataract still a problem that is far from being solved? Statistics, which prove this operation to be one of the most successful in surgery, and one which, in the opinion of all, borders on the ideal, exist, to convince us of the contrary.

But how does it happen, then, that the same successful result is reached by so different paths? It must be true that different routes lead to it. Is there, after all, one single, straight road that leads to the destination, and certain of us have found it, while others are straying in by-paths? That is another question!

If we consider the extreme merit of the colleagues who devote themselves to ocular surgery, it is hardly to be conceded that a small number, among them, have been endowed with a kind of grace; while the others, victims of some strange blindness, grope in comparative obscurity and arrive with difficulty, as if astride the turtle, at the place to which the others have been triumphantly carried by the eagle in his flight.

If therefore we may, without undue temerity, try to solve this problem and even hope to reach a satisfactory solution of it, the task seems, nevertheless, a difficult one.

And, at the outset, on reflecting a bit, one will readily find that there is not a single one, but a rather large number of reasons to explain this diversity of rules concerning the method of operating on cataract.

In the first place it may be due to a *lack of clearness in certain definitions.* Such is surely the case as regards the *maturity* of cataract.

For a long time a cataract has been regarded as ripe, or, in other words, fit for operation, only when the lens was opaque through all its thickness.

Experience has proved that many cataracts are quite ready to be operated upon, though still allowing the ready passage of light. By replacing the term "ripe", which borders on the equivocal, by "operable", one thus brings into a single class the majority of our colleagues. Most of those, indeed, who favor operating on unripe cataracts, mean, thereby, simply such cataracts as are more or less transparent, but which are none the less "ripe" for the harvest.

This does not prevent the existence, among operable cataracts, of a great diversity: such diversity, indeed, that one operative method, for one kind, and another method, for another kind, seem to us more than justified.

It appears to us quite natural, therefore, that he who has more cataracts, of a certain sort, upon which to operate, should give the preference to a method different from the one chosen by him who sees more cataracts of another kind. Thus, we know two colleagues, who practise in the same city, who are equally erudite and both skillful operators. One is at the head of a great, government ophthalmic-hospital, while the other's work is done in his own clinic. The former has more cataracts, upon which to operate, than he wants, and, naturally, chooses the most favorable. His method is the "simple." The other, who has to do especially with those who have not been chosen at the hospital above mentioned, adds iridectomy to his extraction, this seeming to him a simplifying factor, in the numerous complicated cases with which he is concerned.

In this connection, too, a trifle more clearness of definition would be very advantageous. It would be well if the inventors of operative methods would tell us, each time, for what form of cataract the method is recommended.

The classical, senile cataract may be operated upon properly by almost any rational method. In this case, therefore, we need only such guidance as is furnished to us by our own personality and that of the patient. But, besides such cataracts, there exist complicated ones, for which the majority of the brilliant proceedings, extolled in the last few years, do not suffice, which fact their promoters are at some pains not to acknowledge.

Still another cause, which can and ought to influence us in choosing the operative method, is the *temperament of the patient*: in this respect there exist very obvious differences. Some patients are calm, docile and indeed even indifferent and sluggish, while others are impressionable, nervous, unable to endure even slightly acute pain or an operation which is to last any length of time, although, the operation having been concluded, they are able to resign themselves to the essential quiet. The oculist who has more of the patients belonging to the first catagory, upon which to operate, may, without fear, have recourse to the safer method of operating, whose duration, however, since it exceeds that of the courage of the faint-hearted ones, above referred to, would imply, for it, in their cases, a certain danger.

At times, too, the indocility of the patient, by letting us know in advance that he will not observe the quiet that is so favorable to a prompt recovery, will cause us to accord the preference to the method which requires of the patient the least possible tranquillity.

A third factor influencing the choice of operative procedure, a factor of such importance that it is surprising that no more should have been made of it, hitherto, is the *individuality of the operator himself*, his temperament, his intellectual or moral qualities, his manual skill.

The character of one operator rather favors a bold and rapid method, to which, operating in public, he aims to give a sort of *brio.* Another, having in view only the final result, desires above all to risk nothing and he will give the preference to a slower and even more complicated method, but one which seems to him safer.

It may happen, too, that one surgeon uses one knife more easily than he does another, or operates more easily in one way than in another. Is he blameworthy on that account? No more than a left-handed man is blameworthy because he does not prefer to use his right hand, or a right-handed person because he does not become ambidextrous when his adroitness does not favor such a course. For let it be noted that each can obtain excellent results by his method, precisely because that is in conformity with his aptitude. All such persons are right and would be wrong only when they wished to impose on each other the peculiar methods that are their own.

We also see, however, the same surgeon change his way, abandon one way to assume another, resume the abandoned method, to modify it, perhaps, radically, after all, in the end. This shows only the more clearly the influence of the operator's individuality upon the choice of operative method.

It is easy to convince ourselves, indeed, that, as regards the operator, there are not alone certain physical, material peculiarities that are properly to be taken into account, in the so delicate undertaking of cataract-extraction, but, as we have just said, his moral disposition and turn of mind are worthy of consideration.

Cataract-extraction, although it has become a "current" operation is not, on that account, an easy operation. Does not its success depend in great part upon circumstances which are beyond our control, as, for instance, the conduct of the patient, over whom we have but limited influence? Improvements of the operative method, in instruments, even antisepsis and asepsis do not wholly protect us against all kinds of accidents. Some sort may occur, and some accidents do happen to the most skillful and to the most fortunate. These vexations, from their very rarity, are all the more annoying.

Why should it excite surprise, then, if the operator be seen to modify his method, thinking that he has found therein the cause of his failure, against which another form of procedure seems to him to offer more guarantee? He avoids Charybdis. His colleagues will say, perhaps, that he is getting too close to Scylla. And sometimes he will think so, too, and will again change his course, in consequence.

During an entire year I operated upon my cataract-patients without iridectomy. A master in ophthalmology said to me, at that time: "You are now enthusiastic" (I was nothing less than that) "over extraction without iridectomy. I predict that you will change your mind about it. It is a bad method and I am all the more sure of it because, after having operated for a long time, with iridectomy, I became the champion of its abolition and have again resumed, and this time to continue, the doing of the iridectomy."

He was right in a part of his prediction; I became less ardent concerning simple extraction: like himself, I resumed iridectomy, at least for the majority of cases. However there was a gap in his prophecy: it is he who again extols extraction without iridectomy. How are to be explained these tergiversations, these transformations, these oscillations between two methods that are apparently so different?

As for me, I confess that I had annoying complications, due to encleisis and to incomplete expulsion of the cortical remains. I seek to avoid such complications, by excision of the iris, in cases which will be specified later on. The colleague in question, after having suffered similar miscalculations, experienced those of a different character when he operated with iridectomy; for every medal has its reverse. The latter annoyances appeared to him more vexatious than the former, hence he is, until further notice, again the partisan of simple extraction. I say till further notice, for one always risks being forced to change his mind, when one is exclusive

The responses, so interesting and so varied, with which my circular-letter has been honored, are, moreover, the best demonstration of the influence which the *imagination*, or, to use a fashionable term, suggestion, exerts upon the operator.

Many of our colleagues say that they see one of the principal advantages, of cocaïne and antisepsis, in the reduction of the number of losses of vitreous; others do not even mention that accident, but gratulate themselves that they are no longer meeting, as they formerly did, cases of plastic iritis. Hence some have had to deplore mainly, losses of vitreous, the others mourned inflammations of the iris and secondary cataracts.

The same operation has given rise, for both, to quite different accidents. To what has that been due? Probably to the fact that the first, fearing principally the troublesome consequences of incomplete expulsion of the cataract, made rather too extensive and peripheral section and were not sparing of the manœuvres designed to cause expulsion of cortical masses. For the latter, the loss of vitreous, or even a simple rupture of the hyaloid, constituted a greater danger than did the leaving of some cortical substance. They were less bold concerning the dimensions of the operation-wound and the cleaning out of the anterior chamber. The latter, like the former, wishing to avoid one peril, rushed into another.

And with reference to the post-operative discission. Nothing is more curious than the difference of views held with reference to so simple an intervention. Just half of my correspondents consider it as altogether inoffensive, while, for the other half, it constitutes a graver operation than the extraction itself. And all are, of course, decidedly in favor of antisepsis. Whence this further divergence of principles? It certainly arises from the fact that, despite our utmost precaution, it is impossible to guard the vulnerable organ, on which we operate, against all kinds of infection.

Infection has become rare, very rare, thank God! But he who has had the misfortune to lose, even a single time, by a simple discission, an eye to which he had restored sight by means of a delicate and perhaps difficult operation,—that man will have been so impressed by this experience that he will not enter upon this trifling complement of his work without a feeling of the keenest apprehension.

In short, cataract-operation, notwithstanding the investigations of which it has been the object, despite the improvements it has undergone, still presents manifold dangers, and each operator will change his method according to the importance he attributes to one or another of these dangers and according to the means, that nature has afforded him. for avoiding or overcoming them.

Every experienced and well-informed operator will approve this way of doing, and even by so doing will admit that there could not be a unique and universal method for the extraction of cataract. If there be a necessity for individualizing the methods. with reference to the cataract and the patient, it is equally desirable to do it with reference to the operator.

There is nothing more deplorable or absurd, or more inimical to progress, than to want to force everybody to take the same route. It will always be the poor musician who has but one string to his instrument, and a poor surgeon who is acquainted with only a single method of operative procedure. Is it not precisely the dominant quality of the great artist that he knows how to adapt himself to all circumstances, to all needs,—in a word, suppleness, mental as well as manual suppleness? How often has it happened that we have been obliged to modify, during the course of an operation, the method which we believed, in the beginning, to be the most appropriate for that case! To be ready for all events, to cultivate no method exclusively, but to possess all—that constitutes surgery worthy the name.

Hence we have never made investigations or exerted effort to find the universal process for cataract-extraction, but to find the means of obtaining, in so different cases, the result invariably desired, viz.: the recovery of sight.

After all, if we admit the propriety of great liberty in the choice of the method of extraction of cataract, is that tantamount to saying that all methods are good ones? Do we indorse him who, under pretence that he handles scissors better than he does a knife, opens the eye after the fashion of the patriarchs in ocular surgery? Or him who would place the operation-wound in the horizontal meridian of the cornea? Or him who would leave the eyes of his patients free from all protective bandage because there have not yet occurred any accidents due to this simple procedure? No! There are, evidently, limits that are to be imposed upon our method of operating. Although there are several things that one may dare to choose, there are, certainly, others, even among those that have been proposed, that one ought never to permit one's self to do. It is with a view to establishing these limits that we are going to pass in review the different phases of the cataract-operation, employing, as source of inspiration for the task, the experience of our colleagues, as well as our own.

Let us consider, in the first place, the OPERABILITY OF THE CATARACT.

Although, as we have said, experience has proved that operability is in no wise a synonym of *opacity* of the crystalline, there are, nevertheless, some *confrères* with whom the latter is still the principal symptom upon which to base the indications for surgical intervention. Thus Barraquer requires that at least one third of the crystalline be opaque; Chodin, total opacification, or, at least, that of the outer layers of the crystalline; Baguris, Manz, Schmidt-Rimpler, Waldhauer and others wait for the total opacification.

Others fix, according to the degree of *visual acuity*, the time of their intervention. Mme. Rosa Kerschbaumer operates as soon as vision is sensibly altered: Manolescu, when the patient no longer counts fingersat 3 to 5 metres: Bribosa, at 1 metre: Inouye, at 4 feet: Argyll-Robertson, at 1 foot: Juler, when the patient cannot count fingers at all. "When the patient can no longer read Jaeger No. 16," Critchett says: "when he can no longer read," says Bader, etc.

For some colleagues, it is the *age* which shows the time when a more or less opaque crystalline may be extracted from the eye. According to them, after a certain age, which, for Mooren is 56, for Deutschmann 60, for Hischberg 50, [*] for Schweigger [†] from 50 to 60 years, every crystalline ought to have undergone such a senile transformation that it would permit its extraction without hindrance.

Others, finally, are guided solely by "the patient's interest." [‡]

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[*] Hirschberg, *Centralblatt f. Augenheilkunde*, p. 212.

[†] Schweigger, *Ber. med. Gesellsch.*, 2 July, 1890.

[‡] Gaupillat writes to us, with reference to this, certain words due to right feeling and we can only approve when he says that, if we consulted more the patients' interest, we should operate on less cataracts: to which we would add that we might operate otherwise than as we do, sometimes.

as they express it: they do not touch a cataract, however opaque it may be, however brilliant a result may be promised, so long as the fellow eye is still good. They would attempt, without hesitation, the extraction of a very imperfectly opacified crystalline, in the case of a still relatively young person, provided its lack of transparency prevents the patient's attending to his business.

We cannot help doubting if, in this way, the real interest of the patient would always be promoted. It was not without reasons, surely, that our ancestors, our masters, have cautioned us against operating on "unripe" cataracts. That which rendered them circumspect, in that respect, was certainly not theoretical speculations or preconceived ideas. It is evident that, as soon as Daviel's marvelous discovery became known, operators went gaily at the extraction of every crystalline whose total or partial opacity had become a hindrance to vision. But they had to recover from such operative ardor. It had been noticed that, if certain cataracts let themselves be removed with the greatest ease, others always show themselves recalcitrant, issue from the eye with difficulty, rarely give kind healings and leave remains which later form secondary cataract that is more bothersome than the primary cataract was. It is true that, owing especially to antisepsis, such complications have become infinitely less to be feared than formerly, but we are nevertheless, like the great majority of our colleagues, of the opinion, that the time for surgical intervention is in nowise an unimportant matter, but that upon its choice greatly depends the success of the operation. And even if we take into account, as in every therapeutic enterprise, the patient's interest, age and vision, these data will not at all suffice to fix, for us, the desirable time for extraction.

An old man may have a cataract which absolutely prevents his reading, and we will advise him to postpone the operation-epoch, if repeated examination has shown us that the opacification of his lens is still in progress. For the inverse reason, we do not hesitate to attempt, upon a much younger person, the extraction of a much more transparent crystalline, if we have been able to convince ourselves of its stationary or even regressive condition.*

We might say that it is rather the *age of the cataract* than the age of the patient that is of importance to us. The older it is, as an opacification, and the more easily it is disengaged from its capsule, the better result will an operation on it give us. Alf. Graefe exactly expressses our opinion, with reference to that, when he says that "unripe" (*i. e.*, not entirely opacified) cataracts may be extracted with perfect safety, when they distinguish themselves by a very slow ripening (opacification). They are the cataracts with yellow or brown nucleus, with a cortex that is still more or less transparent, as we find them especially in myopes; then, too, the cataracts occupying the posterior pole, at times also the anterior pole, when the nucleus of the crystalline is still entirely transparent; finally the multiple opacities, striated and punctiform, with which the crystalline, otherwise quite limpid, is sometimes, as it were, sprinkled.

If the senile, the classic cataract (which deserves much more than it could formerly have merited, the epithet "*bona et laudibilis*") is generally only the index of an almost physiological change, brought about by age, the form just previously mentioned denotes almost always a profoundly pathological condition of the eye. It is also met specially in eyes affected with a difficulty of nutrition, with choroiditis for instance, and also with myopia, but in cases in which this refractive anomaly is only a symptom of the affection of the uveal tract.†

It suffices to bear in mind the very diverse causes which may engender opacification of the crystalline, in order to understand, without further testimony, how imperfect and fallacious signs-the age of the patient and the diminution of vision are, from which to determine the time of the operation. Does not choroiditis affect all ages and do not the affections of the fundus, to which it gives rise, change the visual acuity much more than can be done by the fact of lack in transparency of the crystalline ?

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*"The opportune time for the extraction of a cataract is that of its maturity, that is, when the maturity is complete and there has resulted a pathological dehiscence between the crystalline fibres and their implantation upon the anterior, sub-capsular epithelium. It is not true that one can not, exceptionally, intervene earlier, but, if this be done, one must expect an incomplete clearing up of the pupil, whence more severe post-operative reaction, and a necessity to intervene again, because of the frequency of consecutive cataracts which result from it."

†. Landolt. *La myopie. Revue internat. des sciences.* 1879, and on Myopia, London Roy. Ophth. Hosp. Report. Dec. 1879.

Often, it is true, these imperfect cataracts suffice, without other complications, to disturb sight to such a degree that all work becomes impossible for the poor unfortunates who are the subjects of them. The operability of his cataract assumes then, for each of them, the importance of a really vital question. And it is on this account an extremely delicate question for the operator. For the success of the operation is never more important than just with those unfortunate ones, whose sight represents the bread-winner.

It is as much with a view to assure success, as to hasten the moment of deliverance, that it has been attempted to *artificially ripen* the cataract. The first means proposed, with this aim, consisted in the making of a traumatic cataract by puncture, the laceration of the crystalline.[*] The result of this operation has not always been good. Often a very brisk swelling of the lens, accompanied by iritis and glaucomatous symptoms, have followed it and have necessitated too hasty extraction, done under very unfavorable circumstances. It is for this reason that von Græfe and Mooren advised letting an iridectomy take precedence of the puncture of the crystalline, and that Schweigger,[†] otherwise very favorable to this method, reserves it for patients not yet out of the forties.

In order to escape the above-mentioned dangers of the puncture of the crystalline, Muter[‡] had already advised, in 1813, not to pass the needle into the substance of the crystalline, but to make simply a moderate discission fo the capsule. Steffan [*] speaks highly of his success with this method; in 330 extractions, he made a preliminary section of the capsule 98 times. He did not once have any bad result due to it. Indeed it was in these very cases that he obtained the best acuity of vision

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[*] Gibson. London, 1811. Von Græfe, *Arch. f. Augenheilk.*, I, 2, p. 219, 1854, and *Arch. f. Augenheilk.* X, 2, p. 209, 1864.

[†] Schweigger, *Berlin. med. Gesellsch.* 2 July, 1890.

[‡] Muter. Practical Observations on various new methods of operation on cataract, London, 1813.

Förster [†] has tried to obtain opacification of the crystalline by a still more delicate method, that is to say by simple massage of the crystalline, without lesion of either the lens or its capsule. As is well known, the author accompanied his procedure with an iridectomy.

It is self-evident that massage of the crystalline is also possible without excision of any of the iris; it suffices to bring the lens into contact with the cornea, by means of a paracentesis (E. Meyer, Copenhagen Congress, 1884). The massage is done through the cornea, sometimes with only the lid, sometimes with the aid of a rounded instrument, as a strabismus-hook or gutta-percha curette, or the like.

De Vincentiis (see the very interesting and very complete thesis that Antonelli, a pupil of Vincentiis, published at Naples, in 1890, on the "*Maturazione artificiale della Cataratta*") advises making the friction in a centrifugal direction, from the centre towards the periphery of the crystalline.

Mooren [‡] uses, to bring about the maturity of the cataract, a process combining puncture, of the capsule, and massage. He commences by opening the anterior capsule by means of a Græfe knife which he passes very obliquely, without letting it enter into the true substance of the lens; then he does the massage through the closed lids. In this way, the author adds, the relations of the lens and its capsule are sufficiently relaxed so that the extraction of the cataract may be performed at the end of from 5 to 8 days. He treats all forms of zonular cataract in this way, and speaks highly of the method.

We have had recourse to the method advised by Förster, each time that ripening has been required by the patient's interest. I do not like to do the extraction in less than a month afterward. I willingly wait longer, if the massage have not brought about a modification in the opacity of the crystalline. I esteem very highly, as will be seen further on, a preliminary iridectomy thus obtained and which is nowhere more indicated than in these cases of cataracts that are both impure and unripe.

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[*] Steffan. *Arch. f. Augenheilk.* XXXV. 2. 1889.

[†] Förster, *Ueber künstliche Reifung des Staares.* Knapp and Schweigger *Arch. f. Augenheilk.*, XII. 1, p. 3; and Zehender, *Klin. Monatsbl. Beilageheft*, 1881, p. 133.

[‡] Mooren. *Fünf Lustren ophthalmolog. Wirksamkeit.* Düsseldorf, 1882.

"When one practises the massage of the crystalline through the cornea, pressing on the iris is to be avoided with care, otherwise one risks setting up traumatic iritis. It is to avoid this danger and, at the same time, to make the massage more efficacious, that some colleagues mass the crystalline directly, by means of a spatula."*

When we approach the topic of the CORNEAL INCISION necessary, for the extraction, we do not meet great differences of opinion. At all events the arsenal, which was formerly so richly supplied with cataract knives, is considerably simplified, now-a-days: the discussions as to the length and breadth, in millimetres, of the blade, have been abandoned, the compass for tracing and measuring, in degrees, the arc of the operation-wound, has sunk into oblivion and, although we have, even lately, heard the extent which it is desirable to give the wound, defined to within one-fourteenth of the corneal circumference, we are pleased to know that operators limit themselves, now, finally, to saying that it is necessary to make the incision conform to the volume of the cataract, at the same time making it rather too large than too small.

It is one of the inestimable benefits of antisepsis to permit us to be no longer so parsimonious with the opening of the ocular globe as formerly, when each millimetre more in the extent of the wound added, by just so much, to the chances of infection.

The great majority of surgeons make this section by means of the Græfe knife. Wecker† extols a still narrower knife. There are only a few who, like Zehender, Schweigger, Steffan

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*Berne Bettman, A New Operation for the Speedy Ripening of Immature Cataracts.—Chicago Medical Society, 1882.

† Wecker, Ann. d'Oc., 1881, page 219, and Wecker and Landolt, *Traité complet d'Ophth.*, II, p. 1006.

Inoye and others, prefer a broader blade, approaching more or less the triangular knife of the ancients.

Theoretically the somewhat broad knife makes a cleaner wound than does the linear knife, but it is necessary, in order to avoid the dangers that it meets, to have a particularly steady hand, and this suffices for the making of a clean section with the linear knife. The latter presents the advantage over the former that the different phases of incision, puncture, counter-puncture and section, properly so called, are executed successively, while, with the broad knife, a part of the section is made at the same time with the counter-puncture, so that the operator is obliged to fix his attention on at least two points at once.

The fine and elegant Græfe knife, moreover, is adapted to so manifold uses, that, besides being an ideal knife, it can and does, in the hands of some operators, replace the lance, for iridectomy, the cystitome, the discission-needle, indeed even the curette, for the expulsion of the cataract.

The immense majority of our colleagues operate above. So far as we know, only Drs. Waldhauer, A. Græfe, Steffan and Schweigger prefer the *lower* margin of the cornea for the extraction of cataract. This method, from beginning to end, is of extremely easy execution. The eye fleeing instinctively upwards, we have not, at least after the counter-puncture, further need for the fixation-forceps, and we may dispense with the blepharostat, because the wound remains always in the opening between the lids. Thus the operation becomes one most easily endurable by the patient. It was for this reason that we formerly operated by this method.

Our method was, in short, merely the old-time, lower, flap-extraction, without iridectomy, done with a Græfe knife. The lids were held apart and the eye-ball steadied, by the fingers of the left hand. It was, as is readily seen, a method which deserved, among all, the qualification of *simple*. But, leaving out of present consideration the prolapse of the iris, of which we will speak later, it seemed to us that the wound, which was thus in the gutter formed by the two lids, was more exposed to infection than when it was covered by the upper lid.

Moreover, we have noticed, at times, a defective coaptation of the lips of the wound, the peripheral border being depressed by the lower lid. Finally, the frequent cases in which the excision of a piece of the iris is necessary, seemed to contraindicate this method, because of the blurring of vision, to which the inferior coloboma might give rise. However, the incontestable worth of the colleagues just mentioned, who, for many years, have operated on thousands of eyes, according to this method, seems to prove that the disadvantages, which are inseparable from it, are not very great, especially when compared with its advantages. Nor shall we by any means hesitate to have recourse to it again, whenever, for whatever reason, the upper part of the eye seems intangible.

As to the location of the wound, it is nearly always made in the *limbus corneæ*. In this connection, it is interesting to note that several colleagues, among others Bronner, Chodin, Deutschmann, von Hippel, Samelson and Tacke, declare that they have believed themselves justified in carrying the section into the cornea itself only since the introduction of antisepsis. We well remember, indeed, that the corneal tissue was considered as peculiarly inclined to purulent infection.

At present, we no longer need to be preoccupied, in the choice of the place for the incision, otherwise than with other circumstances which may have influence upon it. A very voluminous cataract, with a cornea of small dimensions, will require us to approach the sclerotic, in order to obtain a large section, without excessive height of the flap. In cases wherein we fear loss of the vitreous, we shall keep, on the contrary, rather within the limits of the cornea.

It will be remembered that von Graefe's aim, in inventing his "linear" section, was to approach, as much as possible, a meridian of the ocular globe, in order to obtain a more nearly perfect coaptation of the wound. It is interesting to note that Panas extols, for the same reason, just the opposite of what von Graefe did, Panas recommending that the section be made as oblique as possible. If Graefe's principle be followed, the surfaces of the section become very narrow: their breadth would be exactly the thickness of the sclerotic, if it were possible to obtain an absolutely linear incision, *i. e.*, make it coincide with a meridian. Panas seeks, on the contrary, a broad section-surface, considering that, the vaster the surfaces that are in contact, the prompter and more solid will be their reunion.

It seems to me that, here, again, the best is to be found in the golden mean. As regards lineality, in the first place, von Graefe never pretended to have obtained it in any rigorous way. Quite on the contrary, the entirely sclerotical location of the puncture and counter-puncture, required by his method, gave so broad borders, to these two parts of the wound, that it was often difficult to disengage the iris, or, indeed, even the *débris* of the cataract, from them. The impaction and herniæ, of the iris, which often constitute undesirable features of the operation, even when performed by master-hands, have forever put us on our guard against sections which involve too great an extent of the tissues. Manipulations in the anterior chamber, excision of bits of the iris, capsulotomy, expulsion of cortical masses, reduction and smoothing out of the iris, etc., become by just so much more difficult in proportion as the wound is oblique and, in consequence, its edges broader.

What we have just said is partly applicable to the *conjunctival* flap. This last forms a perennial subject of controversy between operators. Some abhor it, as a hindrance to the operation, as a receptacle for *débris* and a possible focus of infection. Others consider it, on the contrary, as a protector of the wound against infection from without (Manolescu, Knapp * and others). For my part, according to what I have just said, the conjunctival flap is rather a complication, and I do not at all seek to make it: but if it happen to made in cases in which, for any reason, I have placed the incision somewhat in the sclerotic, I by no means fear it. It rests merely with me to keep it within moderate limits by turning the knife, toward the end of the section: and cleansing the eye, aided by the spatula that is passed under the flap, seems to me to afford sufficient warrant against the danger of infection. These considerations possess, however, only a very secondary importance, now that antisepsis procures so prompt and perfect healing.

The same is not true of *iridectomy*, which many operators consider an integral part of the cataract-extraction,[*] while others condemn it almost absolutely.[†]

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* Knapp. Trans. Heidelberg Congress, 1886, p. 164.

I have reflected much about this question, which is being debated so vivaciously now-a-days. I have operated with and without iridectomy; I have sought the opinion of the foremost authorities among our colleagues, as much by means of conversation as by correspondence and by study of their publications.

Despite the differences of opinion which still separate operators, it does not seem to me impossible to reach an understanding, provided some willingness be brought into play,* concerning this subject, which appears so difficult to clear up.

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[*] I considered iridectomy as indispensible to assure the lasting success of a cataract-extraction. According to the cases of extraction, without iridectomy, from my statistics, and according to those that I have seen, from those of colleagues, I believe that extraction without iridectomy disposes not only to secondary cataract but also to chronic irido-choroiditis, two affections which gravely hurt the final result of the extraction." —Eperon.

"I maintain the doing of iridectomy in all cases."—Von Hippel.

"I greatly favor the combination of iridectomy with extraction."—Argyll-Robertson.

"I uphold the performance of iridectomy, because it facilitates the expulsion of cortical masses and because I regard as a step backward, indeed, often, even a danger,—the severe *régime* that simple extraction imposes upon the patient."—Manz.

"The cataract-extraction, with iridectomy, is the safest."—Fuchs.

[†] Prof. Williams, of Boston, writes to us:—"I have long since abandoned iridectomy in extractions. * * * * The use of *cocaïne* also increases the facility of placing a minute suture of the corneal incision, in cataract operations, which I was the first to describe and recommend, in a paper published in Vol. VI. of the Reports of the Royal Ophthalmic Hospital, London, in 1867." See, also, Schweigger, Heidelberg Congress, 1888, p. 148, and Panas. Communication made to the *Académie de Médecine de Paris.* Hirschberg. *Centralblatt f. Augenheilkunde*, 1889, p. 264, and in the Trans., of the Heidelberg Congress, 1888, the communications of Gayet, Knapp, Schweigger and Wecker. Wecker justly entitles himself one of the most ardent defenders of simple extraction. "Now-a-days, with the improvements in the operative procedure, as well as in dressing, I have achieved so satisfactory results that I believe myself able to affirm that the simple method can and ought to be applied, with very rare exceptions, to nearly all kinds of cataracts."—Galezowski. *Soc. franç. d'opht.* 1889.

"At present I perform iridectomy only exceptionally and the rare impactions of the iris, in mass, that I have observed, have not prevented, after four to six weeks, having and retaining good acuity of vision."—Bravais.

Here, again, as concerning other points of the subject now under consideration, one sins much by failing to be precise in the definition. Thus we have noticed that many of the champions of *simple extraction*, who seem to recommend it for all kinds of cataract, nevertheless pretty often add an iridectomy to their extraction. If, at such a time, one remarks to them that they are committing a breach of the rule, they reply that it is now a question of a complicated cataract, and that they generally understand, by cataract, the classic, true, good cataract.

It is evident that, on such a plan, we might dispute endlessly, for the *good* cataract may be operated upon by no matter what rational method. But in this *practical* article, we want to speak of all kinds of cataract that are met with in adult patients, and speak of them sincerely and without reservations.

This being understood, I do not expect to meet much contradiction when I declare that the extraction of cataract is never simpler, easier or more durable than when performed on an eye in which the *iridectomy has been previously made.*

The coloboma, by showing us the lens, clear up to its equator, permits us to form an exact idea of the dimensions and nature of the cataract. In this vast pupillary field, the cystotome makes its way and does its work, without encumbrance. Whether we use a hook or blade, we readily perceive whether or not we have sufficiently opened the capsule, and we may enlarge our incision at will. If we prefer the capsular forceps, we do not incur the risk of seizing the iris. In either case, observation of the equator of the lens informs us as to the position of the cataract and will warn us of the least danger of its luxation. We have, at the same time, leisure to follow the movement that we impart to the cataract, by pressure, and counter-pressure, and we can thus render its expulsion as slow or as prompt as we desire. And if, for any reason, the forced extraction of the crystalline becomes necessary, traction-instruments find, in the coloboma, a wide open door.

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* Hirschberg (*Centralblatt*, 1889, p. 24), justly says :

"In a purely practical province, like that of cataract-operation, it is specially desirable not to dispute, with blind passion, as if it were a question of theological dogmas." And, later: "Nothing, in this domain, is more injurious than exaggerations."

The crystalline out of the eye, it is easy to make the *débris* follow its example. In the first place, we see the *débris* clearly, which is the first condition upon which depends the ridding ourselves of it, and then the *débris* encounters no obstacle in the fold of the iris, which places itself in front of them when the coloboma does not exist.[*] Moreover, the iris is never bruised, either at the time of the passage of the cataract or by the manipulation necessary for the removal of cortical masses.

Finally, we need not fear prolapse of the iris. We may take leave of the patient, with full confidence, indeed we may give him much liberty. He will retain his bandage the desired number of days, without our being obliged to endanger the healing by premature inspection of the eye: and this inspection is necessary when there is no iridectomy, each time that the iris has not re-entered spontaneously and entirely, without which one is exposed to hernia of that membrane, which hernia is so much the more to be feared in proportion as one has less completely expelled the *débris* of the cataract.

If, despite all, there have remained in the eye some bits of cortex, strongly adherent to the capsule or having escaped our attention because of their transparence, this incident generally, thanks to the coloboma, has no troublesome consequence: even if they swell, they scarcely come in contact with the iris. And if, instead of being resorbed, they should go on to form a secondary cataract, the pupillary field, made greater by the iridectomy, is nearly always large enough, still, to offer some clear part, which permits satisfactory vision.

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[*] "Iridectomy makes it very easy to extract the capsule and when one does not succeed in extracting the pieces of the capsule, iridectomy permits the making of a very extended and very exact discission.

"It permits, moreover, the watching of the expulsion of cortical masses."—Tacke.

"Besides the greater protection it offers against impactions of the iris, I consider iridectomy very useful because it facilitates the absolute clearing up of the pupillary field and consequently prevents the formation of secondary cataract. In 130 extractions, I performed, at most, four discissions."—Neese. (Kiew.)

"Iridectomy is very favorable to prompt and complete expulsion of cataract and also to prevent or mitigate the dangers of inflammatory processes, which often follow the best performed operation."—De Vincentiis.

Finally, if an ulterior operation should become necessary, the coloboma renders it easier and less painful. But its greatest advantage consists precisely therein, that, by lessening the traumatism of the iris, in facilitating the clearing up of the anterior chamber and in increasing the pupillary field, it considerably reduces the necessity for such secondary interventions.

Now a proceeding which facilitates not only the diagnosis of the cataract but, still more, the most important parts of the operation on it: cystotomy, expulsion of the lens, clearing up of the anterior chamber, which permits avoidance both of traumatism and prolapse of the iris, and, consequently, of the most redoubtable of the complications of that operation, such a proceeding seems to merit the preference over all other methods and one might conclude, from this, that iridectomy ought always to constitute a part of the cataract-operation.

But we must not lose sight of the fact that we have been discussing a preëxisting coloboma. An *iridectomy* that is made *at the same time with the the rest of the cataract-operation*, although it has its advantages, also has its inconveniences which a preliminary iridectomy does not offer.

In the first place, it prolongs the operation: it renders it somewhat more painful and at times complicates it very seriously. Such a complication is met with, specially, in the hemmorrhage which sometimes obscures the field of operation in an extremely bothersome way. In this way the capsulotomy becomes very difficult, because the operator does not see clearly what he is doing. It is true that the blood may almost always be removed from the anterior chamber, but it sometimes renews itself so obstinately that the operation assumes a duration that, of itself, is something of an inconvenience, not to speak of the manipulations made for the removal of the blood. In order to profit by a part, at least, of the advantages of iridectomy, without subjecting ourselves to its inconveniences, we sometimes make the capsulotomy precede the iridectomy. It might be objected, to this mode of procedure, that, the capsule having been opened, the pain caused by the iridectomy might cause a sensitive patient to exert a sudden contraction of the ocular muscles and thus cause too violent expulsion of the cataract. This accident has, however, never yet happened to us. We operate, in the first place, very carefully, and we reserve this method for semi-transparent cataracts, in the case of which kind hemorrhage is peculiarly bothersome; but which, on the other hand, are distinguished for their adherence to the capsule.[*]

Iridectomy has been reproached with complicating the cataract extraction by a traumatism of the iris. The excision is incontestably a traumatism, but the pressure, to which a non-excised iris is subject during the egress of the cataract and especially because of the manipulations necessitated by the expulsion of the cortical masses, is another traumatism that is none the less to be feared. A clean section of the iris has always been considered less grave than a bruise of it. And although the latter is less to be feared since the introduction of antisepsis, the dangers of its cutting are in a like degree diminished by the same astisepsis.

It has also been said that, although prolapse of the iris is less frequent when the iridectomy is made, this latter by no means excludes it absolutely. This is incontestable.[†]

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[*] It sometimes seems to us as if these hemorrhages have become more frequent, since we use cocaïne and antiseptics in connection with our operations. Anagnostakis, who has made the same observation, attributes it to the influence of cocaïne. However this may be, we are careful not to abuse this precious anæsthetic and we use only just enough of it that its effect may last as long as the operation does.

[†] "In 500 operations done consecutively, with iridectomy, I have had to deal with prolapse of the iris only once."—Tacke.

It is well, too, not to forget what Otto Becker himself said, with reference to his discovery, so often cited in favor of simple extraction. "My investigations were made at an epoch in which everybody still operated with iridectomy, so that I do not believe I am wrong in saying that, among the eyes that I examined, there were, at most, 2 or 3 that had been operated on without, for a score that had been operated on with iridectomy. The sense of my *statement* then, and I still maintain it, to-day, is, that it is always rare that the iris is not found engaged in, or adherent to, the cicatrix. But I do not think it permissible to draw, from this observation, a conclusion in favor of simple extraction."—O. Becker, Heidelberg Congress, 1888, p. 176.

It is not rare to find more or less deformed colobomata of the iris, the angles of the pupillary circle approximating the wound, indeed even a bit of iris visible in one of the extremities of the cicatrix. This annoying accident can, however, be avoided, as we shall see, by means of a complete excision and subsequent reposition of the iris.

Finally, it has been justly observed that the coloboma of the iris makes possible the engagement in the wound of a strip of the lenticular capsule. This danger may be avoided either by the excision of a bit of the anterior capsule, or by a horizontal capsulotomy, or simply by means of a spatula, passed between the lips of the wound, to put the capsule again in its place.

However this may be, the inconveniences, just mentioned, of iridectomy, on one hand, on the other the truly seductive appearance of an eye that has undergone an operation without lesion to the iris, finally the extreme facility of this operative procedure, have led a large number of our colleagues to resume extraction without iridectomy or "simple extraction," as it is called.

It is indeed difficult to withstand the charm of this method which is so simple, so elegant in itself and so inspiring of hope for an ideal result, ideal from the point of view of cosmetics, especially.

But is the *cosmetic* point of view justified, when it is as grave a question as of restoring sight to a blind person? Frankly, I think not. Moreover, the ugliness, of an eye having a superior iridectomy, must not be exaggerated. When I see one of my patients on whom I have formerly operated for the extraction of cataract, I am almost always obliged to raise the upper lid to make sure whether or not he had an iridectomy. It will readily be conceded that a defect which becomes manifest only when one raises the lid of him who suffers the defect, cannot sensibly disfigure its victim, especially when he wears spectacles, as is the rule in such cases. *

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* I do not understand the colleagues who, with reference to cosmetic effect, make so much of a round pupil. Since I have been in practice, no patient has ever asked me to so operate on him as to keep a round pupil. The patient desires to *regain sight*, whether it be with a round pupil or with one having the form of a key-hole; that's all one to him, and to me, as a practical oculist, equally.—Steffan, *Arch. f. Augenheilk.* XXXV, 2, p. 183.

For the same reason, we are rather indifferent to the reproach of dazzling to which, according to some authors, eyes with upper colobomata are exposed. An upper coloboma, covered by the lid, could hardly give passage to much light unless its owner desired that it should. The fact is that I hardly recall having heard persons, who had been thus operated on, complain of too much light. And, in short, if so skillful operators as Græfe and Steffan, for instance, who have operated for years on hundreds of eyes, with lower iridectomy, have hardly heard their patients complain of dazzling, we certainly risk nothing, in that direction, with a superior coloboma. [*]

Praise has been given the *greater acuteness of vision* and a sort of accommodation which aphakic eyes, having round pupils, enjoy.

We have even heard proclaimed, in an ophthalmic congress, the absence of astigmatism from eyes upon which cataract-operations, without iridectomy, had been done. There is no need, I think, to refute such assertions, which are good for nothing but to show to what extent the sayings of certain authors are open to suspicion. For, if one dare so disfigure facts whose verification is so easy, what good faith can there be in their affirmations whose truth or falsity is not susceptible of so facile proof?

The accommodation, of eyes deprived of their crystalline, does not exist any more, either. That has already been sufficiently demonstrated by Donders. If eyes deprived of their crystalline see relatively clearly at different distances, this is only a stenopaic phenomenon. [†] Retinal images are, other things being equal, more distinct in proportion as the pupil is narrower. But, in the cases of the majority of those who have undergone cataract-operations, not the pupil, but the opening in the capsule, is the visual aperture. The former may, moreover, by means of the lids, be easily reduced to the desired dimensions, a strategem which ametropes of all kinds have long since found out for themselves.

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[*] Steffan, *Loc. cit.*, p. 184. "No patient of mine has ever complained to me of dazzling, yet I operate downward."

[†] Fritz Schanz. *Verhandl. der Gesellschaft Deutscher Naturf. u. Aerzte, Halle*, 1891.

As to *visual acuity*, Gayet has been kind enough to compute for us the statistics of 195 cases of cataract upon which he operated in 1880, *with* iridectomy and of 195 cases likewise operated upon by himself in 1890, without iridectomy. Now the average acuteness of vision, in each class, is $\frac{1}{3}$, that is to say, absolutely identical in the two classes.*

Fuchs, A. Græfe, Haab, von Hippel, Samelsohn, Schiess, Swanzy, Manz and, among many others, also I, have found likewise, no difference of visual acuity in the two classes of patients who have been operated upon according to the two methods. And it should not be forgotten that simple extraction is generally reserved for the most favorable cases, while one adheres very willingly to the method with iridectomy in complicated cases. †

According to such facts, the argument of the superiority of the visual acuity given by extraction without iridectomy, is likewise reduced to a very slight matter. In a question like the present, the calculation of circles of diffusion, the optical considerations in which one neglects the influence of the cicatrix on the refringent surfaces and that of the lens capsule, as well as of the *débris* of the cataract on the passage of luminous rays—such theoretical speculations are not important. It is practice and not theory which ought to decide, and which does decide in an infinitely simpler and more conclusive way.

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* It is well to note that acuteness of vision is generally tested 12 or 14 days after the operation. It goes without saying that it increases, subsequently; but it is hardly admissible that this modification would be different, for eyes operated upon with, from what it is for eyes that have undergone operation without, iridectomy.

† "A person who has been operated upon for the extraction of cataract, who wears a convex lens of 3¼″ to 4″ focal distance, placed a certain distance in front of his eye, is in no wise hindered, in making his way about, by the increase in his pupillary field. Perhaps rather the opposite would be the case. That is what Berlin has already demonstrated, at the Heidelberg Congress (1869) in his communication concerning the influence of strong convex glasses upon excentric vision."—Steffan, *Loc. cit.*

"I always perform a narrow iridectomy above because it protects most from iris prolapse, while it causes no disfigurement, nor lowering of vision, nor does it affect the power of orientation nor the mobility of the pupil." —Swanzy.

"I think that the optical disadvantages of a coloboma have been unduly magnified."—Sprague.

Gayet's statistics, as well as the observation of investigators who, like him, have proved that the degree of vision is the same, with or without iridectomy, settles the question, as to the acuteness of vision, in an almost decisive way. It remains possible, however, that, if the *average* of visual acuteness be equal for the two methods, vision may nevertheless be much better in an eye operated upon without iridectomy, perfectly successfully, than in an iridectomized eye. If this were true, it would follow that, if the simple method gives, when successful, a greater acuity, it leaves other cases below the average obtained by extraction with iridectomy—that, if it be of surpassing excellence in choice cases, it is bad in unfavorable ones.

The combined method is, moreover, far from excluding the ideal, with reference to visual acuity. It has many times given us vision equal 1.00, indeed even 1.25, that is to say, as much as it is possible to obtain.

The degree of visual acuteness could not, therefore, weigh heavily in the balance. Hence, if many colleagues give the preference to simple extraction, it is from other motives: according to them, the intact iris retains the vitreous, prevents the impaction of the capsule and constitutes a bulwark against the infection of the interior of the eye.

This is possible, though rather difficult of demonstration. It is best not to lose sight of the fact that extraction without iridectomy requires a somewhat larger wound and somewhat greater pressure, for the expulsion of the lens, than does extraction with iridectomy. Those are two factors which favor the issue of the vitreous. Besides, if, in case the vitreous were liquified, with atrophy of the zonule, etc., the rapid extraction of the lens by a vectis became necessary, the absence of the coloboma would make this operation singularly perilous. As to the impaction of the capsule, we shall see, further on, that there are several simple means to prevent this, and, if we scarcely ever see infection of the eye, any more, we owe this benefaction to asepsis, and not to the return to the simple method, which asepsis has favored.

For us, the superiority of extraction without iridectomy consists in its *simplicity*, *ease* and *rapidity*, and the little traumatism to which it exposes the eye, IN CASES IN WHICH IT IS APPLICABLE.

Indeed, here again, as everywhere else, and perhaps more than in any other part of our operation, it is a question of adapting the method to each particular case, when each method will reward us by the advantages it possesses, while, by operating according to one single method, we necessarily expose ourselves to the undesirable qualities that belong to it. *

Thus we have said that simple extraction implies the dangers of laborious and incomplete evacuation of the cortical masses, of traumatism of the iris and of its prolapse. Now these dangers do not exist in all cases, or at least, not in all cases in like degree. An entirely ripe senile cataract, detaching itself easily

*“I am thoroughly convinced that there is no method of operation suitable for all cases, and I have no confidence in anyone's reports that so many hundred extractions have been made, without change or mishap, by one method only. I think good judgment as to the method of operation is as necessary as dexterity in making it. I am not favorable to fads of any kind, and the last one, that all extractions should and can be made without iridectomy, is all a fallacy, and the reports of so many thus made successively, successfully, I am forced, by my experience, to doubt.”—Keyser. (Philadelphia.)

“I think that a definite statement—that iridectomy should or should not be performed—is wrong. Each case should be judged according to its nature.”—Juler.

“I have operated with and without iridectomy; it is best to make the method correspond to the form of the cataract.”—Schmidt-Rimpler.

“At present the rule I follow is:

1. To operate *without* iridectomy in cases in which the cataract is ripe and the cornea large, which permits the making of a non-peripheral, and still sufficiently extensive, incision.

2. To operate *with* iridectomy in cases in which the cornea is small (for here the peripheral incision is obligatory and the chances of impaction of the iris much increased); moreover, in cases in which the cortex is soft, or the cataract unripe.”—Dufour.

“At all events it is best to *choose* the cases in which one can or ought to operate without iridectomy and it is desirable to individualize.”—Brettauer.

“It follows that extraction without iridectomy is not applicable to all forms of cataract, but only to senile, ripe cataracts and to the soft cataracts of youth, that is to say, to cataracts in which the cortical substance is easily eliminated. (Landolt, *Centralblatt f. Augenheilk.*, 1879, p. 234). I now add that not even nearly all these favorable cataracts offer themselves as fit for simple extraction.”

from the capsule, perfectly admits of this simple and elegant method. White and soft cortical masses, that sometimes remain in the eye after the issue of the nucleus, are very easily removable. Usually the iris replaces itself and the pupil contracts, without the aid of a myotic.

Post-operative prolapse is rather rare in these cases, provided we have taken care to remove all the remnants of cortical substance, and that the patient keep quiet during the first days after the operation.*

If, contrary to all anticipation, the iris should evince a tendency to prolapse, it is best, in our opinion, to excise it before applying the bandage.

We advise, indeed, that one do not incur the risk of prolapse of the iris, which is sometimes produced, even in the apparently most favorable cases, and with all the more reason in cases wherein the iris has not spontaneously resumed its place.†

To reduce a prolapse of the iris the day after the operation for extraction, is certainly a bad proceeding. One thus runs the risk of carrying infection into the interior of the eye, and one is almost sure to fail of accomplishing one's main purpose. The iris, thus replaced, will only exceptionally remain in position: the prolapse will be reproduced.

Impaction of the iris, while it has lost its gravity, since the introduction of antisepsis, nevertheless constitutes a perpetual danger for the eye. By putting the uveal tract in contact with the external world, it exposes the eye not only to one of the most deleterious of infections, but it constitutes the conditions in which, as Snellen clearly pointed out at the London Congress in 1881, a sympathetic affection of the other eye is most easily established. So consecutive glaucoma has again been observed *very recently* by Nuël as a consequence of post-operative impaction of the iris.

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* At the time when I operated on all kinds of cataract without iridectomy, I believed at first that prolapse of the iris could be prevented by by making a corneal section like Liebreich's. This was an error from which I promptly recovered, thereafter carrying the entire wound to the vicinity of the edge of the cornea. Prolapse and impaction of the iris are less frequent when this is done, without counting other advantages of the peripheral, corneal incision.

† This is likewise the opinion of many of our ablest colleagues, like Drs. E. Meyer and Deutschmann. They write us that, in cases of *senile cataract*, they proceed each time as if they wished to get along without iridectomy, but they perform it each time that, after the exit of the lens and cortical masses, the pupil remains "somewhat displaced upward."—(Deutschmann.)

We therefore consider *simple extraction* indicated in cases of *simple cataract*, that is to say, cataract that is susceptible of easy elimination and is present in persons who are, moreover, healthy, docile and reasonable.*

In the not infrequent cases of impure or complicated cataract, on the contrary, the iridectomy is a means of facilitating the extraction, a warrant against complications in the course of the healing, and against even later ones; also a guarantee of the reëstablishment of a satisfactory acuteness of vision. And it must not be forgotten that our duty is not at all to obtain a certain number of ideal results, at the risk of losing a few others. It is best, as in target-shooting, to *seek, not to make one single bull's-eye*, but to make the greatest number of *good shots*, the excellent ones coming, then, of themselves. We ought to seek to restore sight to the greatest possible number of our patients.†

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* "Simple extraction is as safe an operation as combined extraction (perhaps even safer, on account of the rarity of cyclitic processes.

But it is certainly superior to it not only from the point of view of cosmetics, but from the optical standpoint.

It could not, however, properly be recommended as a general method, for, as long as we fail to exclude prolapse of the iris in all cases, it is certainly indicated to make an iridectomy whenever the pupil, after the expulsion of all the *débris* and despite repeated attempts at reposition, does not become quite circular or is deformed by movements of the eye and of the lids."—Knapp, Heidelberg Congress, 1888, p. 172.

"As regards the operation that one would perform on one's own father, no hesitation ought to exist, *if he is affected with a veritable, senile, ripe cataract, if he be in such hygienic conditions that he can observe the repose, for a few days, which simple extraction requires*, it is best to operate without iridectomy. The axiom is this: For a simple cataract, a simple extraction."—De Wecker, *Arch. d'Opht.* 1892, p. 351.

† Let us cite, in this connection, the witty observation of one of our correspondents, Dr. B——, who says: "Let us add, between us, that the gratitude of cataract patients being usually in inverse proportion to the purity of the operation, it is not best to seek the ideal for them, but rather the certainty of success for ourselves."

Thus iridectomy is indispensible in cases of synechiæ, each time that the cataract ought to be removed by means of a traction-instrument, as a vectis or curette: it seems to us indicated whenever the etiology and aspect of the cataract, its age, that of the patient, the general condition of the eye, etc., cause to be foreseen a very strong cohesion between the lens and its capsule, a coriaceous cortex, difficult to remove: finally, each time that the patient is incapable of enduring the quiet that is indispensible to prevent a prolapse of the iris.[*]

We have, besides, the satisfaction of knowing that our way of thinking is shared by most of our colleagues. The majority of them, whom we have interrogated, favor iridectomy, which they perform in the majority of their cataract-extractions.[†]

There need to be, certainly, very strong reasons for giving the preference to a longer, more difficult, harder method, for patient as well as operator. Still more significant appears to me the fact already cited, of two colleagues of equal merit and like age, of whom one, who has the upper hand in the matter of cataracts, because he is the chief in official service, operates brilliantly according to the simple method, while the other, to whom fall the cataracts that are not officially chosen for operation, keeps, as a general rule, to iridectomy.

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[*] "Impactions of the iris, irites and irido-choroidites, pupillary occlusions and secondary cataract are, especially, much more frequent after *simple* extraction. This method requires, moreover, a tranquility of which many patients are incapable and which, for a great number, is a serious motive for fearing the cataract operation."—Manolescu.

[†] "I consider iridectomy as very useful, if not indispensible, in all cases in which the cataract is not quite hard, which is very frequently. It insures a good cystitomy, an exact and rapid toilet, simplifies the manœuvres of expulsion and renders unnecessary the removal of the bandage."—Bagneris.

"I do simple extraction only in completely ripe, senile cataracts, with prompt reaction of the pupil. And even in such cases this method has not given me better results than has extraction with iridectomy."—Chodin.

"Led by my experience, I have reached the conclusion that the advantages of an operation without iridectomy cannot compensate those of an operation with iridectomy."—Desjardins.

Englebienne likewise declares that he operates without iridectomy only in altogether favorable cases.

"There are always many cataracts whose operation with iridectomy gives a better result than does the simple method."—Schiess.

The other day I showed to a colleague, who was visiting my clinic, some patients upon whom the operation without iridectomy had been done. "That's fine," said he, "it's even too fine, it's *du luxe*." I smiled, without venturing to contradict him.

A colleague who is an excellent operator, and director of one of the largest clinics in the world, writes to me, with praiseworthy candor, that, at the hospital, he operates without iridectomy, but, in private practice, with iridectomy. Reflect thereon, young colleagues and friends!

Listen, still, to the venerable words of an old master in our art. Professor Stellwag von Carion writes to me: "I practiced the old-fashioned flap-extraction for 25 years exclusively, and consequently acquired great dexterity in that method. So I changed from it with much difficulty, but, since 1869, I do extraction with a broad excision of the iris. Because I learned to greatly fear prolapses of the iris. A large coloboma makes possible, moreover, the complete expulsion of the remains of the cataract, solely by stroking, without the introduction of instruments into the interior of the eye."

Many other colleagues, among whom we may cite Bobone, Dianoux,* Foucher, Hansen Grut † and Osio have likewise resumed iridectomy after experimenting with simple extraction.

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* "I practiced, for eighteen months, *l'essai loyal* of extraction without iridectomy; I have entirely abandoned it."—DIANOUX, *Ann. d'Ocul.*, p. 239, 1892.

† "For almost a year I performed the operation *without* iridectomy, the flap having a little more height and being slightly less peripheral. The following are the reasons for my abandoning this method:—I have not had a single loss to deplore and, certainly, the execution of this method is much easier. But, 1st, I have had, in not a few cases, prolapse of the iris after two or three days, or even at the end of a week; in these cases I was obliged to do excision, which I performed at once and, it must be admitted, without accidents. 2nd, in a few cases the round pupil could not be dilated, and a thin, secondary cataract somewhat lowered the functional result. 3rd, It must be conceded that a round pupil has but a third of the size of one that is enlarged by the coloboma of the iris. Hence, the chance that an otherwise perfectly clear route for light is to be found *behind* the iris is, in the operation *without* iridectomy, twice as great as in the case of the operation *with* iridectomy. Hence the necessity of making the discission of the secondary cataract oftener, in the case of the former method. My statistics, of the three operations, coincide very well with those furnished by Schweigger. Let us add, moreover, that the spectre of prolapse haunts the operator continually, while the operation with iridectomy lets him sleep quietly and see that it is right to do the iridectomy."—HANSEN GRUT, *Ann. d'oc.*, p. 77, 1892.

We have weighed, in what precedes, the *pro* and *contra* of combined and simple extraction and have reached the conclusion that, though the former has its disadvantages, those of the latter are in most cases graver than those of the former and that iridectomy, far from being a useless mutilation of the eye, considerably adds to the safety of our operation.

Hence it seems to us that the patient can afford to pay the price of a certain prolongation of the operation and the slight pain produced by the section of the iris, if he thus obtains more freedom during the treatment that follows and, above all, an extra guarantee of the recovery of his sight.

As to the disadvantages of the combined extraction, it is possible to reduce them to a very slight matter. Thus, as concerns *hemorrhage*, we are to be patient, if that takes place, at the same time guarding the eye against infection, by means of cold, aseptic compresses; or we will remove the blood by means of small cotton tampons, themselves sterilized, and moistened with antiseptic or sterilized water. In case of an exceptionally abundant and rebellious hemorrhage, one should always have the resource of letting the wound cicatrize and finishing the extraction a few weeks later. Then one would have, in fact, made only the *preparatory iridectomy*, as many of our colleagues advise doing in all difficult cases.

Impaction of the lens capsule is most surely avoided by the removal of a large bit of the anterior capsule. If one prefer the cystitome to the capsule forceps, it suffices to direct it horizontally, as is advised by O. Becker and Snellen. The strip thus obtained is hidden under the iris and cannot become engaged in the wound.

As regards the encleisis of the iris, which, as we have said, may happen in spite of the iridectomy, there are two ways of obviating it. The first is to spread out the iris, with the aid of a fine spatula, immediately after the iridectomy, at first (Gayet, Horner, Snellen, Dohnberg and others), and then again before the application of the bandage. We have seen this manœuvre, when executed by a master hand, notably by Gayet, succeed so well that even the microscopic examination, of the eyes thus operated upon, almost never showed the least impaction or pinching of the iris. This toilet of the iris is indispensible when one makes *small* colobomata.

For my part, I avoid prolapse after iridectomy by always excising the iris as much as is permitted by the extent of the corneal wound. *

When I perform a simple iridectomy I calculate the dimensions of my section according to those of the coloboma that I propose to make. I draw the iris out of the eye and cut it, pressing the scissors strongly against the globe. In this way the iris entirely re-enters, by merit of its own elasticity, and of that of the globe. It rarely happens that I am obliged to disengage the iris from the wound, and to spread it out. If I make a large incision, as is required by cataract extraction, I also make a larger excision of the iris: convinced that the blurring which might result from a larger coloboma, (but concerning which, up to date, I have heard only some operators speak, never those who had been operated upon) is a less grave inconvenience than encleisis, even than the repeated touching of the iris, which is necessitated by the spreading of it out.

Moreover a larger coloboma is very often welcome. We speak of more or less complicated cataracts. In such cases, in spite of all our care, in spite of a perfect capsulotomy, in spite of massage, of washings, of curetting the anterior chamber and the capsular sac, there still remain *débris* of cortical masses.

These, before being resorbed, swell, are often even only imperfectly resorbed, they opacify, become organized, and form with the capsule a secondary cataract.

Now the evolution of this latter will present so much less danger in proportion as the *débris* comes less in collision with the iris, that is to say, as the pupil is larger. The larger it is the more chances there are that a part of the pupil will find itself free from obstruction by the secondary cataract, that it will give access to light and procure good vision for the patient.

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* As will be seen, I have somewhat modified my way of operating since 1879. In an article which I published at that time in *Hirschberg's Centralblatt*, and in which I set forth the basis of simple extraction, I said that I performed, when necessary, a small iridectomy. But it must not be forgotten that, at that time, we were not acquainted with the local anaesthesia of the eye, and that, to render extraction as painless as possible, I then operated below.

The expulsion of cortical masses is unquestionably more difficult when the iris is intact. Secondary cataracts are also, *cæteris paribus*, more frequent under such circumstances, than when there is a coloboma. One is, therefore, often obliged, after a so-called simple extraction, to excise a bit of the iris, whether to arrest an organic, inflammatory process, or to open for light a window beside that which an evil genius has closed. Now if an iridectomy is necessary, is it not better worth while to perform it, before these accidents have been produced, that is to say, on an iris that is still healthy, and not adherent to a secondary cataract?

We go even still further, and claim that if iridectomy ought often to accompany the cataract extraction, there exist some particularly complicated cases, in which it is well to make it precede the extraction by an interval of several weeks.

One thus suppresses the undesirable qualities of the simple method, at the same time lessening those of the combined method, and one places one's self, relatively to the cataract, in the position that we pronounced, at the beginning of this paragraph, to be the easiest, the most desirable for the operator.

Snellen, Becker, Foerster, * and many other colleagues have proved that, after an iridectomy, the cataract ripens more rapidly. This would constitute another considerable advantage of this method. I hear it objected that by thus operating twice upon the patient, one exposes his eye twice to the dangers of infection. This is incontestable, and our faith in the bactericides is not so absolute, that we consider the least wound, even when made with the antiseptic precautions now known to us, as sheltered from infection. So that we never subject our patients to the least operation without absolute necessity.

One always risks when one operates, but one risks more or less; we certainly risk less, by performing, with vigorous aseptic precautions, an iridectomy first, then, after complete healing, the extraction, than if we make the whole attack at once, whether with or without the iridectomy, upon a more or less complicated cataract.

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* Foerster, Transactions of the Heidelberg Congress. 1881, page 133.

Even in the pre-antiseptic epoch, we have scarcely lost any eyes with iridectomy, and God knows how much certain operators, who now-a-days decry most the dangers of this operation, have, at that time, used and even abused it.

The danger of infection for an iridectomy is in fact almost *nil.* Steffan,* has even had in 530 extractions, much fewer cases of infection in his operations with preliminary iridectomy, than when he has performed at the same sitting, both extraction and iridectomy.

Moreover, do not those who deliberately practice discission, some weeks after the extraction of the cataract, subject their patients to two operations? Of which the second, however simple it may appear, is certainly more dangerous than a preliminary iridectomy.

But the extraction of an incomplete, but complicated cataract, without iridectomy, exposes the patient not only to two, but to *several* secondary operations: excision, or destruction with the cautery, of the prolapse; operations upon the secondary cataract, which operations, as we shall see, are *all* more dangerous than the iridectomy, and which this latter almost always renders superfluous. We are moreover, in this matter, still far from being alone in our cautions of prudence. Colleagues who find in the *preliminary iridectomy* a prudent safeguard, are more numerous than is generally supposed. Among our correspondents, Bronner (Bradford) performs it, "if possible, always, six weeks before extraction"; Eversbusch says that *he is very fond of it*; Steffan no longer operates, since 1888, without the preliminary iridectomy. Keyser of Philadelphia, who can justly say that, in his large *clientèle*, he has tried all rational methods of extraction that have been proposed, declares squarely that: "The best practice is to make a free iridectomy, six to ten weeks previously to the extraction." So Sprague of Boston finds, "a preliminary iridectomy, done two or three weeks before extraction, the safest procedure." Barraquer performs it in all cases of cataract that he considers unripe; other operators, in all particularly complicated cases.

Prof. Dor declares that if he, himself, had to undergo a cataract operation, he would have a preliminary iridectomy made. For my part, I strongly share this opinion, as my pupils will, without doubt, remember. And, in a general way, I have often repeated to them that when we find ourselves in doubt, whether or not it would be desirable to operate, or which method is to be chosen, there is one very simple means of escape from the dilemma, and that is to ask one's self what he would have done to himself. We need never depart from the observance of this maxim. It is not calculated, it is true, to increase the number of operations or to make us choose hazardous methods, but it is certainly in conformity with the interests of those who grant us their confidence.*

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* *Loc. cit.* pages 197–198.

But let us pass to another phase of cataract extraction, that of CYSTITOMY. This is a very important part of our operation, and often exercises a greater influence, than is generally supposed, upon the result. Although it is a subject of much controversy, there is at least agreement concerning this point, that it is best to make it as extended as possible. We differ only as to the choice of the proper means to obtain this large issue for the opaque crystalline.

The method of Gayet and Knapp, which consisted in lacerating the capsule at the equator of the crystalline, and which left intact the anterior as well as the posterior capsule, no longer has many amateurs. Its greatest inconvenience is the necessity of a discission of the secondary cataract in almost all cases.

Gayet, as formerly Wenzel, as Sanson, and more recently Galezowski, and many other of our colleagues, now uses the Græfe knife, whose point he causes to pierce the lens capsule, between the puncture and the counter puncture.

Thus one completes, at once, the section of the cornea and that of the capsule, and one is sure of having opened the latter through a considerable extent. The most leathery capsule scarcely resists a well directed linear knife. The proceeding is therefore not a bad one; however, that which its partisans praise as an advantage of it, that is to say, being able thus to do two things at once, is not, in our opinion, an advantage. We prefer to proceed methodically, and do one thing after the other. The change in direction, which it is necessary to give to the knife, in order to make it pierce the capsule, and to prevent escape of the aqueous humor, which escape is not always avoidable, must often modify the corneal section, which we desire to have clean and in conformity with the plan proposed in the first place.

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* It is true that it is not always easy to induce a patient to let his cataract operation be divided in two. The principal reason, for this aversion from accepting wise counsel, is found expressed in a letter from Dehenne, wherein he says: "The ideal, without doubt, would be to be able to do the operation at two times, with an interval of about a month. But why go and propose to any patient to intervene twice to extract a cataract, when one has repeated to him, in all tones, that the extraction of an opaque crystalline is easier and less dangerous than an operation on corns!"

In the same way concerning the section of the capsule, we like to make it freely, beyond the margin of the pupil, taking away a bit of it, especially in the case of capsular cataract, not being obliged to confine ourselves to the opening made, by the way, with the point of the knife.

The resistance of the capsule being very variable in different cases, we use, for the cystitomy, some times, an extremely fine hook (Snellen) and, at other times, the equally well known, small, triangular blade. In order to be prepared for all emergencies, we have arranged these two instruments on the same handle. The stem of each is, moreover, flexible, in order that we may be able to give them any desirable inclination.

If a capsule prove too resistent to yield easily to the hook, one has only to reverse the instrument, and the blade will certainly overcome it, and if the opening should, nevertheless, appear too limited, nothing is simpler than to enlarge it with the hook. The latter may even serve, in case of necessity, to remove a bit of the anterior capsule.

There is no doubt that, if it were possible to take away a good part of the anterior capsule, the cataract would issue from the eye much more easily than though the most extended of the tearings or sections.

The danger of impaction of capsular strips, between the lips of the wound, would disappear at the same time. The attempts made, by Colsman, Weber, Becker, Foerster, von Wecker, Meyer, Couper, Alessi, Armaignac, Schweigger, Smith and others, to tear the strip from the capsule by means of forceps, are, therefore, most meritorious, and have given excellent results, as we have been able to convince ourselves, as well by observation as by our own experience.

This method does not seem, however, to be yet free from all adverse criticism. It is reported as against it, that even the sharpest forceps, and those most ably directed, sometimes meet an almost invincible resistance, or, at least, such, that the pressure necessary in order to first pierce the capsule, entails the risk of rupturing the suspensory ligament of the crystalline, and of bringing about very annoying accidents ; as luxation of the crystalline, escape of vitreous substance, or both these at once. Then, in the absence of a coloboma, it must at times be difficult to seize the capsule extensively enough, without pinching the iris.

It is true that recently, Kuhnt and Smith, of Detroit, (Mich.) * have devised a capsule forceps, whose branches are curved in such a way that they do not come in contact with the iris, when the teeth seize the capsule.

The first combines, moreover, in a happy way, the simple cystitomy with the tearing. After having opened the upper part of the capsule, by means of an ordinary cystitome, he introduces into this wound one of the branches of the capsule-forceps, and thus always succeeds in bringing away a large piece of the capsule.

Smith's instrument having been in our hands only a short time, we have not yet had occasion to experiment much with it ; but, each time that we have used it, it has seemed to us to very well fulfill its destination. In general, as we use the capsule forceps only discreetly, and when the iris has been excised, we have as yet had nothing with which to reproach it, unless it has been that it has sometimes declined to serve. In one case, on the other hand, we have been fortunate enough to bring away, with it, the whole cataract, in its capsule, without losing one drop of the vitreous body, and with the most pleasing final result.

It is in this connection to be regretted that one cannot always

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* E. Smith, The Journal of the American Medical Association, September, 1891.

remove the capsule at the same time with the crystalline, the former being so often, of itself, prejudicial to the visual acuteness of the operated eye. The operation of Alexander Pagenstecher, cultivated by his worthy successor, Hermann Pagenstecher, has, indeed, up to the present day, remained restricted to a small number of cases, particularly favorable to the application of this method. But we entirely share the opinion of Laqueur, * when he says that antisepsis authorizes us to extend the scope of our operative undertaking, and to attempt especially, oftener, the extraction of the lens in its capsule.

We have just said that we consider cystitomy one of the most decisive acts in the cataract operation. Many accidents are due mainly to the imperfect opening of the capsule, or to a displacement of the crystalline, occurring during this act and escaping unperceived. The easiest means, of guarding against these disagreeable surprises, is to operate only with a perfect light.

The ILLUMINATION that we commonly use, is only too often insufficient for operations on these delicate, transparent or semi-transparent membranes, like the capsule, and at times, let us say at once, or the cortical masses, capable of escaping the surgeon's eye and bringing about, later, serious complications.

Let us be frank, and admit that, a great part of the time, we do not even see the tear we have made with the cystitome. It is the extreme sensibility of our fingers, the advance of the crystalline, the appearance in the wound of soft masses, that indicate to us that the capsule is ruptured. But at times these symptoms are lacking. The cataract does not stir, and, although it seems to us that we have traversed the capsule with our instrument, we are not very sure of the extent of the incision that we have made, If, then, the cataract does not yield to the pressure made upon its equator, one wonders, with anxiety, to what this resistance is due. Could the corneal incision be too limited, or, what amounts to the same thing, could the lens be more voluminous than we had supposed? Is it the iris (when no iridectomy has been made) which resists? Is the cohesion, between the crystaline and its capsule, particularly strong, or is the capsulotomy insufficient? Is it necessary to enlarge the

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* Laqueur, *Ann. d'oc*, 1892, page 79.

corneal wound, or increase the pressure made upon the recalcitrant crystalline? Is it best to have recourse to iridectomy, with which one had supposed one's self able to dispense, or renew the manœuvres of the capsulotomy? Or is it best to resort at once to radical measures, and remove the cataract with a traction instrument? According as the operator recognizes, or fails to recognize, the cause of this little incident, the result of his operation will be a success, a partial success, or even a failure.

A good illuminiation will surely guide him in the midst of these difficulties. It will instruct him as to the dimensions of the cataract (if there be a coloboma), as to its position, as to its tendency to become engaged in the wound and as concerning the opening that has been made in the capsule.

It is a genuine revelation, when, for the first time, one projects upon an eye the concentrated light from a powerful source. One seems to issue from obscurity, and one wonders, not without reason, how one has ever dared to do gropingly, so to say, so delicate an operation as that upon cataract. We can only applaud Chibret, * the inventor of the ophthalmological phare, and those of our colleagues who, like Abadie, von Hippel, Snellen, von Wecker and others, use the electric light, in operating on the transparent parts of the eye.

This is a great betterment brought to bear upon the cataract operation, upon the capsulotomy, upon discission, and upon what is called THE TOILET OF THE EYE. Indeed if a powerful illumination is valuable during the extraction of the cataract, it is, perhaps, still more so afterward. We all know that the exit of the lens in no wise constitutes the last act of the operation.

Nothing is simpler than to cause to issue from the eye a ripe or unripe cataract, with or without iridectomy, provided one open to it broadly the two doors, that of the capsule and that of the globe The true difficulty commences, oftentimes, afterward, when it becomes a question of ridding the anterior chamber, and especially the capsular sac, of the lenticular *débris*. However, no one will deny that this cleaning constitutes one of the essential conditions of the success of the operation. It is true, and therein lies one of the inappreciable benefits of asepsis, that the cataractous remnants are much less to be feared than formerly, when they brought about, almost invariably, an iritis with exudations, a secondary cataract, more redoubtable than the primary, indeed even iridocyclitis and choroditis, with loss of the entire eye and threats of sympathetic ophthalmia.

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* Ophthalmological *phare* of Col. Mangin and Dr. Chibret, *soc. française d'opht.* 1886, page 342.

Thanks to the rigorous asepsis, usually observed, now-a-days, the iris no longer takes on inflammation, often the pupil yields to the effect of mydriatics, dilates and, generally, the residue of the cataract resorbs entirely or, at least, partially.

Generally, we say, but not always, and he who trusts in its doing so, thereby often exposes himself to bitter disappointment. All erudite surgeons try, therefore, to obtain, immediately after the extraction, as clear as possible a pupillary field.

The most natural and most inoffensive means, of doing away with cortical masses, is, in our opinion, massage, executed with the lids. This rubbing is infinitely milder than that done with whatever instrument, and it admits modifications, as to its intensity and direction, that a hard body does not permit. Moreover, both the operator's hands can thus act concensually, by pressure and counter pressure; at the same time operating with the extreme delicacy required by manipulations upon a globe opened by a large wound, and lacking its crystalline. No other surgical operation requires so much patience as does the clearing out of the anterior chamber. Patience is already indicated by the time necessary for the renewal of the aqueous humor, which powerfully aids us in our undertaking.

At the same time that we are very prudent concerning the introduction of instruments into the eye, after the issue of the lens, we have often, however, recourse to a little curette, which we have had constructed *ad hoc*, and which has rendered us the greatest service, without having ever acted prejudicially upon the eye which has undergone the operation It is a very fine curette, flat enough to pass easily under the iris, sufficiently excavated, however, to gather the soft parts and bring them out of the eye. Thanks to its form and to its rounded borders, the curette serves likewise in the reposition and spreading out of the iris. The instrument bears at its other extremity a flat surface, which is very useful in the *toilet* of the iris and of the wound. Both curette and spatula are of silver, hence easy to render aseptic. Moreover nothing hinders their being made of gold, whose contact, according to Waldhauer, is still milder; or of platinum-iridium, as is recommended by Gruening, because this metal endures being brought to a white heat, without deteriorating in consequence.*

It is with a view to a radical clearing out of the anterior chamber that there have been invented syringes, pumps and hydraulic apparatus of all kinds, to inject into the narrow space, between the cornea and the iris, floods of all sorts of liquids.†

These intra-ocular irrigations are far from having gained the sympathy of the majority of our colleagues. Most of our correspondents tell us that they consider them "useless and dangerous." Many have abandoned them, after becoming convinced, by experience, of the undesirability of these manœuvres. It is only to be regretted that the ingenious constructors, who formerly recommended to us, with so much insistence, their syringes, should have neglected to tell us, with what discretion they use them at present. At most, the tube that one formerly carried even so far as under the iris, now barely enters a corner of the wound, in order to let penetrate into it, no longer "as much as half a pint" of a sublimate solution, but a very modest quantity of an anodyne liquid.

We even seem to have not yet reached an agreement as to the proper extent of irrigations of the anterior chamber. Some recommend them solely for an *antiseptic purpose*,‡ and warn us to guard against trusting to them to expel the cortical masses. Others, on the contrary, propose them as *the best means of obtaining the desired clearness of the pupil*, and hold that, employed as antiseptics, these injections would be most dangerous.[*] It is best to say that this last opinion has prevailed, and has been confirmed by clinical experience, as well as by that of the laboratory.

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* Transactions of the Medical Society of the state of New York, 1891 page 354.—Gruening.

† Von Wecker, McKeown, Uhle, Vacher, Panas, Gayet, Chodin, Terson, Inouye, Wicherkiewicz and others.

‡ "It is only from the time when I adopted the habit of washing out antiseptically with a boric acid solution of 3 to 4%, the anterior chamber, that I havs seen all suppuration of the iris and of the cornea vanish."—Panas.

For our part, we have never had confidence in this antisepsis of the anterior chamber, convinced that an antiseptic, powerful enough to annihilate in a moment so resistant organisms as the staphylococci,[†] for instance, must constitute, in itself, a danger for the delicate membranes of the interior of the eye, the endothelium of the cornea, the iris, the hyaloid, etc. Nor have we ever understood the alarming articles, in which, on divers sides, one accuses sometimes cocaïne, sometimes one or another of the antiseptic solutions, of producing indelible opacities of the cornea[‡] We have never experienced them, because we always respected the anterior chamber too much to treat it as a bacteriological laboratory. The remarkable experiments of Nuël and Cornil[§] have since proved that, if solutions injected into the eye for an antiseptic purpose are inefficacious, as such, they exert on the contrary, for the most part, a deleterious influence on the corneal endothelium.[‖]

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[*] "The washing out of the anterior chamber, with an antiseptic preparation, is contrary to our scientific ideas. We should thus deceive ourselves, to the detriment of our patients."—SATTLER.

[†] According to Koch the vitality of certain bacteria is so great that they resist for an hour, a sojourn in a sublimate solution of 1 : 5,000.—*Mitth a. d. k., Gesundheitsamte*, vol. 1, page 274, 1881.

[‡] *Vide*, among others, Mellinger, *Centralblatt f. Schweizer Aerzte*, page 466, 1891.

[§] *Nuël Congrèss Francais d'opht.*, 1889, *et Nuël F. Cornil. De l'endothelium de la chambre antérieure*, etc. *Arch d'opht.*, page 309, 1890.

[‖] At the congress of Medical Sciences, at Barcelona 1888, page 784 of its transactions), Aguilar read a most interesting work on cataract operations. We find in it the following passage: "We were among the most enthusiastic in applying antiseptic injections, and we made use of the borated solution of von Wecker. Not being in the habit of chloroforming the patient, during a cataract operation, I have experienced great inconvenience in manipulating the irrigator on a free eye, animated by involuntary movements, but the hope, of triumphing over infection, was strong enough to make me disregard these difficulties. But, alas, a suppurative

Intra-ocular irrigations can, therefore, according to these authorities, be discussed only as a mechanical means of removing cortical masses. The liquids used for this purpose ought to be absolutely inoffensive, as 4% boric acid,* or the physiological solution of the chloride of sodium, and at the temperature of the body. Even sterilized water is, apparently, badly borne by the membranes in question. The epithelium of the iris, the lenticular capsule, and especially the hyaloid, do not tolerate more easily than the corneal endothelium, the contract of solutions of the bi-chloride or biniodide of mercury and of other, similar microbicides, I am convinced that many post-operative complications find their explanation in this irrational use of antisepsis.

As a means of making the toilet of the eye, intra-ocula injections are in favor with a considerable number of our colleagues, among whom we cite, as the most eloquent, Gayet, who tells us

iritis destroyed my faith and, for the last two years, I no longer use irrigation."

Vacher, one of the promotors of intra-ocular injections, has made, with reference to them, some very interesting experiments. He performed two series of more than a hundred extractions, one with intra-ocular injections, and, in the other series, merely causing the lips of the wound to be touched by a fine stream of borated water. These two series have been equally successful, both as regards the immediate, and as to the final, result; "Thus, since that time," continues the author, "I have less often used intra-ocular irrigation, which demands manual accuracy and scrupulous precautions, that are not always observed. Rigorous asepsis, of the operative field and the lachrymal ducts, renders intra-ocular irrigations useless, when the extraction of the lens has been complete, and the clearing up of the pupil perfect."

"Intro-ocular injections are superfluous as antisepsics, in the majority of cases, and insufficient to remove the remains of the cataract."—Knapp.

"I have frequently used intra-ocular irrigations, but I have totally abandoned them because they are often followed by a condition of irritation of the eye, in comparison with which the possible advantage, of these irrigations, does not deserve to be taken into account."—A. Graefe.

"For a time I tried prudent intra-ocular irrigation, after the extraction of the lens, but I gladly abandoned this detestable way of doing." Hansen Grut, *Ann. d'oc.*, 1872, page 77.

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* The apparatus used by the eminent Lyons surgeon, for the preparation, and keeping of sterilized water, as well as for intra-ocular irrigations, is described in de Vinay's manual, page 311. It resembled Richardson's atomizer.

that he is "extremely fond" of washings of this kind, made *without the introduction of any instrument*, with the firm, tepid jet.* "They nicely expel the *débris*, restore the pupil and capsule, clear out the blood, and clean the lips of the wound."

Thus used, of course with a perfectly inoffensive liquid, these washings certainly have their *raison d'être*. Still, we reserve them strictly for cases in which the aqueous humor does not suffice for the clearing out of the anterior chamber. We perform them with the greatest prudence, not only as regards the asepsis of the solution, but also as to its quantity and as to the pressure with which it is injected or, rather, introduced into the anterior chamber.†

Since the preceding lines were written, Chibert has announced here‡ the results of his remarkable experiments with the cyanide of mercury.

This author seems to have found, in a solution of 1 :20,000 of this salt,§ a powerful antiseptic, which is "without detriment to the exterior transparency of the cornea and of the other media" This solution serves him, therefore, at the same time, for the

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* GAYET.—Transactions of the International Congress of Ophthalmology at Heidelberg, 1888, page 129.

† The simplest instrument, resembling a dropper, with metallic tube, flat and curved, of which our friend, von Hoffmann, has made us a present, has served us perfectly for some years. The management of it is very easy and the quantity of liquid, that it contains, amply suffices. The sole reproach we have to make to it, is that the three parts of which it is composed, being, one of metal, the second of glass, and the third of rubber, necessitate special antisepsis for each; the first two the heat of the autoclave, the other needing chemical measures. The author has recently succeeded so well in constructing of glass a flat and fine tube, with a lateral opening that this instrument bears, perfectly, immersion in the antiseptic solution.

‡ *De l'antisepsie de l'oeil*, etc., *Arch. d'opht*, 1892, page 433. CHIBRET.

§ The complete formula of the solution used by Chibret, in his intraocular injections, is as follows:

	GRAMMA.
Hydrargyri Cyanidi, - - - -	0.05.
Sodii Chloridi, - - - - - -	7.00.
Aquae destillatæ - - - - -	1000.00.

Picric acid, traces for a yellowish coloration.

expulsion of cortical masses and to render antiseptic the contents of the anterior chamber.

SECONDARY OPERATIONS, IN THE EXTRACTION OF CATARACT.

Let us remark that, from the first to the last act in cataract-extraction, conscientious operators have been preoccupied with one thing; that is to free the eye, not only from the opacified part of the crystalline, but also of all the contents of the crystalline sac, if not of the lens in its capsule itself.

It is with this purpose that they make the wound as extended as possible, that many of them excise a bit of the iris (sometimes very regretfully), that they try to tear as large a strip as possible from the anterior capsule, that there have been invented spatulas and curettes, to extract the lenticular *débris*, and that recourse is had to intra-ocular injections.

This preoccupation is among the most fully justified. All the ingenuity expended with this aim, is best applied. It must be admitted, moreover, that it would often be worthy of a better recompense. Finally, although the cataract operation ought to seek to create an absolutely clear pupil, we are far from succeeding in doing this in all cases. Whoever shall give us a sure means, for attaining this end, will have his place marked beside the illustrious Daviel.

It is true that we can consider with great satisfaction the progress accomplished in recent years. In proportion as the healing of the wound has become infinitely prompter, surer and cleaner than formerly, so the *débris* of the cataract, which it is not possible to dislodge from the eye, have considerably diminished in quantity. It has lost, especially as to its gravity, and this despite the hardihood with which we now attack cataracts that would have formerly been considered inoperable.

Nevertheless we nearly always leave the posterior capsule in the eye. Often also, in the case of complicated cataracts, there remain cortical masses, whose forced expulsion would expose the eye to serious danger. The capsule, generally transparent, sometimes, however, opacifies and becomes corrugated. Cortical masses, instead of being resorbed, often form a secondary cataract, semi-transparent, it is true, but sufficiently opaque to prevent the formation of a distinct retinal image.

The result of our operation thus finds itself more or less compromised and a secondary surgical intervention is indispensable.*

This operation will sometimes consist in an *iridectomy*, or an *iridotomy*, sometimes in the *extraction of the secondary cataract.*

The iridectomy is done most easily with the lance; the iridotomy, by means of one of the knives invented for this purpose, or with von Wecker's scissors. The extraction of the capsular sac, with its contents, by means of an iridotomy forceps, has been particularly cultivated by Panas. It has likewise done us excellent service, in appropriate cases.

In the above mentioned operations, dragging of the iris is to be carefully avoided, and the operation should be done in scrupulous conformity with antiseptic regulations. Otherwise, one incurs the risk of losing, irreperably, the organ that had already been half rescued from blindness.

The dangers of these operations are known to all. Moreover, we shall speak of them still more explicitly in connection with the discussion of discission. The tearing, cutting and opening of the membranule, which obstructs the pupil, in a word, DISCISSION, is, indeed, the secondary operation that is oftenest performed after the extraction of the cataract.

This is the most important intervention, since it is that which must lead us to the final purpose of all our operative undertaking. It might, moreover, seem altogether simple and inoffensive, since it has a bearing only on the slightly resistant parts of the eye, and requires only a minimum wound.

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* We are not speaking here of this secondary cataract, in which the lenticular *débris, en masse* with the products of plastic iritis, and the iris itself, form a complete obstruction of the pupil. This deplorable condition of the eye, is generally the operator's fault, an irreparable fault, for it has never been said clearly enough: these cases, that are considered so "favorable for the iridotomy," almost never give, and could not give, a satisfactory result. The reason for this is that the inflammation, which is called iritis and irido-cyclitis, because it is designated according to what is apparent to the observer, has involved the entire uveal tract, that the exudate from the iris, that is visible, has been accompanied by an exudate from the choroid, that is invisible, but which will forever prevent the patient's seeing, inasmuch as it has disorganized the retina and obscured the vitreous body.

But on this point, the opinions of our colleagues are still very divided, many among them, as Knapp [*] and Kuhnt, who perform discission, so to say, after each extraction, consider it as absolutely without danger, when performed, of course, with the necessary precautions.

Others, on the contrary, and their number is very great, have recourse to discission only as a last resort. Many tell me that they perform it only when the patient does not see enough to be able to read.[†]

There must be strong reasons why this should be so ; for why abandon the patient with three-tenths of visual acuteness, when a simple tearing of the capsule may give him 80%, and perhaps even normal vision.

Others, indeed, are more explicit, and squarely declare that they reckon discission as among the most dangerous of ocular operations.[‡] They have observed after this intervention, so innocent in appearance, acute or chronic iritis and iridocyclitis, fulminant panophthalmia, indeed even sympathetic ophthalmia.

To have once lost, in this way, an eye to which vision had been happily and skillfully restored, suffices to put you forever on your guard against an operation which may have so sad consequences.

It appears, however, that this accident is not very rare. I have before me, printed statistics of a great clinic, in which one of the operators,[§] has had 2% of iritis in cataract extraction, and two in sixteen, that is to say, 12½% after discission. And although he has been able to perform more than three hundred extractions, without a single case of suppuration, he has lost, from panophthalmia, one eye in sixteen, operated upon by discission, which would represent 6.25 *per cent* of loss. Another surgeon of the same institution,[*] counts 1.48 *per cent* of panophthalmia for his extractions, and 9.09 *per cent* for his discissions.

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[*] "With the exception of a small number of cases, in which the anterior capsule has been partly removed, no extraction of cataract is complete unless the secondary discission is perfect."—KNAPP.

[†] "For the last 20 years I have intervened a second time only when the acuteness of vision has been insufficient to permit the patient to go about freely, and to read and write."—PANAS.

[‡] Gayet expressed himself as follows at the Heidelberg Congress of 1888, concerning an operation upon capsular opacities, consecutive to extraction : "There is no operation that I fear more. It appears to me always uncertain, often useless, at times very dangerous."

[§] TROSSEAU.—*Compte rendu de la clinique des Quinze-Vingts*, 1890–1891, page 29.

To what are to be attributed such grave consequences of an operation which scarcely merits the name?

It is evident that if the instrument, that is used, is contaminated, it can carry the germs of infection even to the centre of the eye, into the vitreous body, which is an eminently favorable soil for the culture of micro-organisms.

In such a case, it is not the operation that should be accused, but rather the operator, for nothing is easier to sterilize, than the point or blade used in discission, in-as-much as it may be brought to a white heat, if necessary, before its entrance into the eye. But it is averred that accidents of this sort have occurred, despite the strict application of the rules of antisepsis, so far as known up to the present.

In all times, dragging, exercised upon the iris and ciliary body, has been incriminated as being able to bring about grave consequences.[†] It is in order to avoid them, that many of our colleagues use, for discission, two needles, which act in opposite directions, and of which one guards the iris against the traction exercised by the other.

Noyes uses, for this purpose, a method which seems to us preferable to the preceding, because it is more regardful of the vitreous body. After having performed, by means of linear knives, two small openings in the cornea, he introduces through them two very fine hooks, whose extremities penetrate the pupillary membranes. By drawing the two instruments simultaneously in opposite directions, the discission is made without lesion of the iris or ciliary body.

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[*] CHEVALLEREAU.—*Compte rendu de la clinique des Quinze-Vingts*, 1890-1891, page 23.

[†] "The least traction upon the ciliary body, especially in an eye already traumatized, may provoke a pernicious irido-cyclitis."—EPERON. Bribosa and Critchett write me to a like effect.

Other operators have tried to replace the traction-instrument by a cutting blade, the tearing by a section, whether by means of a very fine knife or by means of scissors like von Wecker's. Knives designed for discission sometimes have one,[*] sometimes two edges.[†] Good results may be obtained with either kind.

Although certain operators so little fear the laceration of the vitreous body as to perform discission after the mode of the ancient depression, from behind forward, through the sclerotic, others recomend, on the contrary, that the instrument be not turned after its penetration into the pupillary field, but that it be guided as nearly as possible parallelly to this plane, in order not to disturb the vitreous body more than is necessary. (Deutschmann, Dohnberg, etc.)

Knapp[‡] and, later, Haab have observed that infection of the eye may arise from the fact that a little thread of the vitreous body, following the instrument in its withdrawal from the eye, becomes placed between the lips of the wound, and, finding itself thus in contact with the ambient air, forms, for several days, a way of communication for infectious micro-organisms.

All these observations appear to us most just, and we consequently take, for each discission, the most minute precautions. It is necessary in the first place, not to let it follow too closely after the extraction. Otherwise, one risks bringing about, by cumulation of operations, an irritation of the eye that creates a soil favorable for infection. It is for the same reason that all traumatism, notably traction of the iris and of the ciliary body, is to be scrupulously avoided.

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[*] Knapp's seems to us the best model of this sort.

[†] The discission knife, that we have recently used, is in all respects like Knapp's, except that it has a blade with double cutting edge; the heel is rounded, so that it entirely fills the opening made by the blade, and renders easy the change in the direction of the latter.

Deutschmann, Dohnberg and Schweigger use a linear knife with a double cutting edge. "This latter makes a clean corneal wound, which promptly cicatrizes and exposes the eye less to hernia of the vitreous body, and *to the penetration into its interior of the corneal epithelium,*" Deutschmann writes us.

[‡] International Congress of Ophthalmology, Heidelberg, 1888, Transactions, page 172.

But the essential thing will always be to observe before, during and after this operation, as rigorous antisepsis as our present knowledge permits. We proceed, in fact, in case of a simple discission, if possible with more antiseptic rigor even than for the cataract extraction. If the after treatment does not last so long, it requires, in our opinion, as much prudence as that of the extraction. * If the least trace of the vitreous body shows itself in the wound, one should take care to destroy it, by means of the galvano-cautery, as Knapp recommends.

Culver writes us that he does not proceed to a discission, until after having assured himself that there does not exist, and never has existed, a pathological alteration of the vitreous body, in the eye that has to undergo the operation.

I would call attention, indeed, to the fact that the susceptibility to infection, of the various parts of the eye, is very different. It increases from the surface toward its middle, in proportion as the tissues are protected against the deleterious germs, by more delicate membranes and epithelia and by a less active sanguinary or lymphatic circulation.

It follows from this fact that the more the deep parenchymata of the eye seem, in their normal condition, to be sheltered from infection, the more they are exposed to it in reality, in abnormal conditions.

Thus let us consider, first, the lids. Does he who observes the simple rules of cleanliness often have serious accidents after an operation, performed upon these organs, so exposed to all external, injurious influences? Let us next consider the cornea, constantly in contact with the ambient atmosphere, with the conjunctival secretion, a vehicle of all imaginable micro-organisms. When protected by an intact epithelium, does it not resist, indefinitely, even blennorrhagic pus?

The conditions are very different for the interior of the globe,

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* "The treatment following discission ought to be sufficiently prolonged and the patient kept under observation until all threat of iritis shall have disappeared. Without this precaution, one is exposed to grave complications."—EPERON.

more rarely reached by violence or deleterious germs coming from without. There are certainly still protective membranes, but they are not as solid as the epidermis, or as the corneal and conjunctival epithelium.

We have seen that the covering, of the posterior surface of the cornea, is destroyed by chemical agents that the anterior surface readily endures. We know the sensibility of the iris and the facility with which germs of infection develop in the cortical substance of the crystalline, debarred of its capsule. *

As regards the vitreous, this is still a very different matter. The hyaloid is an excellent bulwark, so long as it exists, but it is very fragile and, without it, the vitreous body has yielded to infection, without defense and without remedy, and the vitreous body is the centre of the globe. Its infection is equivalent to the ruin of the entire organism. This is why we have always feared loss, indeed even the simple presentation, of the vitreous in the wound, as a most dangerous accident. This is also why we consider discission, and all operations which bring this tissue, so eminently susceptible of infection, into relation with the external world, as most serious surgical intervention.

We have already spoken of a secondary operation, which the extraction of cataract may necessitate, that is to say, the *destruction, by cauterization, of the prolapsed iris*, or its *excision.*

If we have to do only with a slight impaction, the first of these operations is not exactly dangerous. The same cannot be said when it is an instance of a true hernia. Is it always possible to carry with impunity a red-hot iron into the ciliary region, which has always been known as eminently vulnerable? Moreover, in spite of the destruction of that portion of the iris which is outside the surface of the globe, the impaction in the cicatrix persists nevertheless, with all its dangers.

It is in order to escape this grave annoyance that Panas performs the complete excision of the prolapse, by means of a linear knife and with scissors. It is necessary, for this operation, that the patient be chloroformed, otherwise this painful operation might bring about a formidable loss of vitreous.

This is assuredly a very bold, and very radical method, but it is not to be denied that it singularly complicates simple extraction, whose consequences it is designed to remedy.[*]

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* Compare CHIBRET, *Arch. d'opht.*, XII, page 434-444, *et seq.*

We arrive, then, at this conclusion: that any of the secondary operations (with the sole exception of the cauterization, which fulfils its purpose only very imperfectly) is more dangerous than the extraction itself. If this is true, must we not logically conclude that the preferable method of extraction is that which exposes the eye least to secondary operations? Now, *cæteris paribus*, it is indubitably iridectomy, especially preliminary iridectomy, which gives us, in great measure, this guaranty. It facilitates the expulsion of the cortical masses, it increases the pupillary field (which has been made a subject of reproach to it!), and prevents the prolapse of the iris.

No one will deny that an iridectomy, performed on a still intact eye, is an infinitely less dangerous operation, than secondary excision, or discission, because the interior of the globe then finds itself still guaranteed, by the lens, against infection. Those colleagues who frankly avow one panophthalmia in sixteen, indeed in eleven, discissions, and those who write to us, more vaguely, that experience has demonstrated to them that it is a *dangerous* operation, with which they have had "very annoying" accidents, and which has caused them to lose many eyes, scarcely mention the results of their iridectomies, which they have made by hundreds, perhaps by thousands. The reason for this is simply that they consider it quite natural to be free from bothersome accidents, consequent upon so anodyne an operation as iridectomy.[†]

BANDAGES.

However succint may be this review of the cataract operation, we cannot dispense with a few words concerning bandages. Although certain operators have tried to do without bandages, and though others, like Michel [*] and Alt, [†] permit their patients to return home after extraction, with the offset of having them come back for consecutive treatment, we believe we express the opinion of the great majority of our colleagues, when we say that a protective bandage is extremely desirable, to assure a prompt healing and exemption from complications.

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[*] "I am profoundly suspicious of excision even with asepsis," says Gayet, (page 132 of the Transactions of the International Congress of Ophthalmology, at Heidelberg), "if it does not bring about phlegmon, it may provoke grave ciliary accidents."

[†] "The iridectomies have all healed in three or four days, with the greatest ease." TROUSSEAU. *Compte rendu de la clinique des Quinze-Vingts*, 1890–1891, page 21.

Also Chisolm, [‡] although he has always shown himself very desirous of reducing post-operative dressing to its minimum, has considered it useful at least to keep up the occlusion of the eye that has undergone the operation.

These conditions, of repose and of prudent care, seem to us particularly important, in cases wherein we have not done iridectomy. [§] We could not better express our opinion with reference to this, than Gayet [||] has done in his work, already cited, at the Heidelberg Congress, in which he says: "The operation once finished, if the patient makes a spasmodic movement, we see the redoubted accident" (the prolapse of the iris). This constitutes, therefore, a cause of encleisis: we guard against this, by the care we take to insure the great calmness of the patient, immediately after the operation. As to this matter, we approve fastidious care and precautions that are, apparently, most ridiculous. We have an understanding that the patient is not to quit the bed in which he was when the operation was done, that he is to be alone, in darkness and silence, nursed by a person whose steps and ways are familliar to him, and that, abandoning himself to the simple, vegetative life, he is to let the hours pass in quiet somnolence. We would prefer that he were able to sleep the first forty-eight hours, without waking, for the awakening is always a moment of dangerous surprise. If there be needs to satisfy, he must satisfy them, in natural and easy poses, since any constraint may bring about spasm. In a word, it is best to resume the former precautions, from which we have lately had, perhaps, too much tendency to deviate."

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[*] "I operate upon cataract cases in the polyclinic" ("ambulatorisch"), "but with iridectomy."—MICHEL.

[†] "I operate according to circumstances, in my office or before the class in the dispensary, and allow the patient to go home, either on foot or in the car, and let him come to my office for after treatment," says Dr. Alt, in the St. Louis Weekly Medical Review, of the 12th of December, 1891, page 463, though at the same time extolling the advantages of simple extraction, which he performs almost exclusively.

[‡] *Compte rendu du* IX *Congrès International des Sciences médicales à Washington*, 1887, page 709.

[§] Pflueger having noticed, as have many others of us, that the prolapse of the iris is produced, especially under the influence of the movements which the patient makes immediately after the operation, has discontinued doing extractions in the operating chair, and operates upon his patient while he is in the bed in which he is expected to remain tranquil for several days. "The colleagues who have become modern enough to let their cataract patients return home after operation, and to care for them thereafter as ambulatory patients, certainly do better to continue performing the iridectomy," our Berne colleague very justly says.

[||] Gayet, *Loc. cit*, p. 130.

This is simple good sense, coming from the eloquent mouth of a good master. It seems to us that all evidence is in favor of the proposition that, to prevent prolapse of the iris, and to obtain a rapid healing of the wound, and as the best warrant against infection coming from without, repose is essential. If we had to undergo a cataract operation, we should prefer that the operator should protect our eye, by means of a firm bandage, even against the involuntary movements of our own hands.

Now what we should demand for ourselves, we have neither the heart nor the right to refuse to our patients. It is true that, exceptionally, one meets patients who are more agitated when one leaves them tranquilly in their bed than when they are permitted to converse with those about them. In other cases, it is the state of their health that interdicts the prolonged decubitus. As a matter of course one will permit the former to have stories read to them, and one will not neglect to let the latter be seated in bed, or in rocking-chair, as much as is agreeable to them. But I admit that, in such conditions, I would not risk the extraction without iridectomy, which requires, up to the time of the healing of the wound, almost absolute repose. *

It is necessary, self-evidently, that the bandage protect the eye without annoying it, especially without making pressure

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* "An iridectomy is to be done for every patient who cannot bear to remain lying three or four days without stirring."—PFLUEGER.

upon the eye-ball, which pressure might become prejudicial to a good coäptation of the wound. This aim may be achieved in various ways, and the permission to apply, in each case, the bandage that he regards the most applicable, must be accorded to each operator. Up to the present we have used oval bits of gauze with which to cover the lids: then we fill, with absorbent cotton, the depressions about the globes, so as to obtain a uniform surface, upon which passes the gauze bandage, without compressing the eye. Every part of the bandage that we use, during and after the operation, comes directly from the autoclave and is, consequently, absolutely aseptic.

With few exceptions, we cover both eyes. The bandage holds better; the immobility of the eye, that has undergone the operation, is more complete, and the patient, finding himself thus in relative obscurity, has no contractions of the iris. We can, for the same reason, dispense with darkening the patient's room, which is a very great advantage from a point of view of ventilation and cleanliness.

Of course we see no hindrance to substituting for the bandage, wound around the patient's head, plasters, which, after having passed over the dressings, shall stop at the temples, at the forehead and cheek, leaving the rest of the head free. (Snellen.) Lately we have used, with great satisfaction, a wire gauze mask which wonderfully protects the operated eye, covered with cotton, and which is kept in place by two small rubbers passing behind the patient's head. We have this useful little apparatus from our eminent friend, Fuchs, of Vienna, but it seems to be due to Prout's genius.* It can readily be sterilized, chemically, or, better yet, by the autoclave. Its somewhat hard edges are to be, each time, wound with cotton.

Confident of the importance of rest for the normal healing of the eye, we leave the bandage in place as long as possible: three or four, and even five days. The eyes being then rigorously cleansed, the bi-nocular bandage may often be replaced by a similar bandage, covering only the operated eye, or by protective glasses. Starting out with the idea that all antiseptics lose, at the end of a certain time, the sterilizing action that they have upon the tissues, Chibret[*] replaces, at the end of twenty-four hours, the bi-nocular bandage by blue *coquilles* glasses. The operated eye is simply covered with a bit of batting, or the bandage is renewed daily, with a view to dropping into the eye a solution of the cyanide of mercury. Our colleague, Clermont-Ferrand, at the same time, permits his patients to go about, merely enjoining them to avoid very bright light.

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* Prout.—The American Journal of Ophthalmology, Nov. 1890.

ANTISEPSIS AND ASEPSIS.

Only isolated voices are raised against antisepsis, prentending that it is superfluous,[†] indeed even, "like the whole germ theory, repugnant to common sense,"[‡] inferior to the excellent spring water of the capital. Apart from this our colleagues are unanimous in recognizing, in antisepsis, the cause of the greatest progress that surgery has ever accomplished. Even the simplest operations and those that are never accompanied by grave complications, are followed by prompter and cleaner healing, since the principles that Lister, led by Pasteur's work, has formulated for general surgery, have been applied to their treatment. But it is very especially cataract-extraction that has profited by this fecund innovation.

We now smile at the enthusiasm with which a renowned surgeon, at the end of the first twenty-seven of his cataract operations that were done according to Lister's method, exclaimed : "In twenty-seven cataract operations there has not been a single suppuration of the cornea nor of the entire eye. The number is not very considerable, but such a series of successful cases has never been observed in the hospital in which I perform most of these operations."[§] We do not doubt that, by continuing to operate, since, with the perfected antiseptic and aseptic precautions, this "successful series" has grown considerably larger. Indeed it is by hundreds that one now counts successes before their series is interrupted by the loss of a single eye.

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[*] CHIBRET. *Loc. cit.*, page 442.

[†] "For me, the operative technique is all, and it is because we have been unskillful, that we latterly accuse the microbes of a *rôle* that we have played ourselves." (WOLFE, *Annales d'ocul.*, Nov. 1891.)

[‡] These are textual expressions, found in certain answers to our circular inquiry.

[§] ROSSANDER,—*Hyd omraden för den antiseptliska sarbehandlingen* (*Hygiea*), 1879.

The comparative statistics, that men of our calling, in all countries of the world, have published, are sufficiently well known. They demonstrate, in figures, the eminent advantage that this admirable conquest of modern surgery has exercised upon our operations. The written and oral replies to our inquiry, that we have received, are a no less conclusive proof of this.

For our own part, we repeat, with the same assurance with which we said it in the lecture which constituted the opening of one of our courses of operations: "Much more important even than local anæsthesia are the advantages we derive from antisepsis. It is a veritable and immense benefit: so great that future generations will never know how to appreciate its just value, for they will never have seen absolutely healthy, absolutely well-operated eyes, or those affected with a wound which was at first insignificant, go off in suppuration, to the despair of the patient and the discouragement of the operator." *

Let us not, however, permit ourselves to be blinded by enthusiasm. Infection, apparently so happily combated along the whole line, is far from being finally vanquished. It reappears still, here and there, in a way by so much the more painful for us, because we expect it less. †

But let us not be discouraged by these failures. The discovery of infectious micro-organisms is still so recent that our ignorance, with reference to them, is nothing astonishing, dishonorable or properly discouraging. Let us work, observing

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* LANDOLT.—*Progrès médical*, 23rd November, 1889.

† "Already, before the introduction of antisepsis, properly so-called, I had relatively favorable results, (3 to 4% of loss): now I do not have even one case of suppuration in a hundred extractions; but I have not succeeded, more than any other mortal, in entirely suppressing it. However rarely we may be thus troubled in our apparent security, we ought to recognize in it, nevertheless, the proof of the imperfection, generally, of any human enterprise, of ocular antisepsis especially."—SATTLER.

without relaxation, each in his own domain, the *savant* in his laboratory, the practitioner at the bedside of his patients. Let us utilize the facts that others discover! But let us guard against mutually borrowing theories! Theory is a language, understood only by the initiated, and which causes the profane to speak and commit stupidities. It is a provisory bridge, thrown out by explorers toward a country still unknown. He who believes himself able to use it with safety runs the risk of foundering or of going by a false route.

We abstain, therefore, in this purely practical article, from entering into the details of bacteriology. We confine ourselves strictly to the territory of the clinician, trying to sum up, in simple language, what experience seems to have demonstrated to be useful in our art.

The aim of our antisepsis is to shield from infection the organ upon which we operate. Now it does not seem doubtful that infection, and that of the most redoubtable variety, may come from the organism itself, from germs whose habitat is at times in parts of the body far removed from the place which our operation concerns, or from substances that the economy engenders, even without the concourse of micro-organisms. *

Unless it is a question of an ulcer, an abscess or some other palpable affection, whose healing we are awaiting, we are, as yet, nearly unarmed against this AUTO-INFECTION.

It is, on this account, all the more important to subject the patient to a profound general examination, before proceeding to an operation as important as is extraction of cataract. One should not decide upon the latter, before having rid the patient as much as possible of any ill, capable of becoming a focus of infection. But, very fortunately, this species of contamination is by far the rarest. The infection comes oftenest from without; its agents are found on the skin, the hair, the eyebrows and eyelashes of the patient. They nestle in the humors secreted by the mucous surfaces of the eye, and multiply in the lachrymal sac. They ought to be sought, moreover, in objects that touch the eye, the operator's hands, the instruments, the articles used in dressings, among others the collyria.

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* Compare, in this connection, notably the interesting communication of Panas, to the French Surgical Congress, 1892.

As we have remarked above, the epithelia and endothelia guard the eye, in its normal condition, against the noxious influence of the bacteria, whose contact it may thus endure with impunity. Deprived of this protective layer, as is true in the case of a wound, the organ finds itself exposed to the invasion of the enemy. To avoid this calamity, we must seek, therefore, to hold every infectious germ remote from the eye, during the operation, and up to the time of the cicatrization of the wound. It is necessary that every object, that comes into contact with the eye, should be free from septic organisms.

Now we know two ways of obtaining this asepsis Let us name, first, the surest, namely, HEAT. No organism can resist a temperature of 120°. * This fact seems to have been incontestably demonstrated.

Besides heat, we possess CHEMICAL MEANS, substances which, whether pure or in solutions of certain concentration, destroy, at the end of a certain time, the bacteria known up to the present time. Only it is evident that what causes the death of one organism, may also kill another, and many bacteria are more tenacious of life than is the physiological cell. The difficulty is, therefore, to efficaciously combat the infectious germs, without prejudice to the operated eye; to find, in the whole number of antiseptics, that which has only one cutting edge; or, if the cutting edge is double, to manage it in such a way as to utilize only the one that we wish to.

As to the *hands* of the operator and his assistants, as they will scarcely endure a sojourn in the autoclave, one can and one ought to attack them. first, energetically, with soap and warm water, expel from them all the adherent contaminations, with a brush and the nail cleaner. Then one has to remove from them fatty bodies, by plunging them in absolute alcohol, and should sterilize them by means of a solution of a powerful antiseptic, as the sublimate (from 1:1000 to 1:500), the biniodide of mercury, recommended by Panas, Listerine, a combination of menthol, eucalyptol and boric acid, formulated by Randall, resorcine, used by Englebienne, etc., etc. After this powerful disinfection, it is perhaps well to dip the hands in a less concentrated solution of the same antiseptic or, indeed, in sterilized water. The majority of our colleagues proceed directly to the operation, without drying the hands. I confess that, to me, it is disagreeable to operate with moist hands. Fearing, on the other hand, to contaminate them, either by drying or by touching, involuntarily, non-sterilized objects, I take care to pass them, as they finish the antiseptic bath, into *sterilized gloves*. They are simple cloth pockets, having a rubber band that keeps them rather tight at the wrists. The hands, therein, become dry in all safety. I may touch whatever I choose to, without risk of infecting them again. I do not remove the gloves before I take up the instruments. This is a little means of simple and practical antisepsis and I can warmly recommend it to my colleagues.

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* (Centigrade) 248°, in the Fahrenheit scale (Translator's foot-note).

In spite of the relative facility with which one disinfects his hands, and although, in ocular operations, they do not come in direct contact with the wound, I never undertake a cataract operation after having touched other eyes. I perform private operations in the morning and, at the clinic, always operate *before* the other consultations.

The articles used as parts of the surgical dressing, absorbent cotton, gauze *rondelles* and ribbons, the mask mentioned before, the collyria and water used during the operation, all are sterilized in a Chamberland's autoclave, which produces steam at 120°.

There is no objection to letting non cutting instruments, also, stay in it: notably the blepharostats, and those which serve in the intraocular injections, the silver sounds, the spatula and curettes may be put into it, without harm, provided they have metallic handles. Ivory splits and cracks, in so high a temperature.

As to *cutting instruments*, there must be, for them, a *dry air autoclave*, because they would rust in dampness. One ought, moreover, watch very attentively, that the temperature do not exceed 120°, * otherwise the steel risks a loss of its

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[* 248°, Fahrenheit. Translator's note.]

temper. One of the most competent instrument manufacturers tells us that, very often, the thermometers of autoclaves are far from being trustworthy, and that they continue to indicate a temperature of a little above 100° (212° Fahrenheit), when it has already passed 200° Centigrade, a temperature deleterious to the temper.

On this account, some have attempted to disinfect instruments by plunging them in *boiling water.* Experience seems not to have been unfavorable to this simple procedure. It is best not to forget, however, that some pathogenic germs resist a temperature of 100°.[*] Boiling water is not, therefore, an absolutely trustworthy antiseptic. So the majority of operators seek to obtain, *chemically*, the asepsis of instruments. But we meet here another difficulty, that of finding an antiseptic liquid sufficiently active to destroy the bacteria, without being detrimental to the cutting edge of the instruments.

The substance which, up to the present, seems to best fulfill these conditions, is the *oxycyanide of mercury*, in solution of 1%, or even 1:200. Chibret recommended this salt of mercury to the International Congress at Heidelberg. Vignal has subjected it to the most profound study, from the bactericide point of view. Many surgeons, among them myself, use it with great advantage.

We leave the instruments for at least forty minutes in a solution of the oxycyanide of mercury, 1:200. This solution being very irritating to the eye, we substitute for it, next, sterilized water, whence the instruments pass directly into the hands of the operator.

In an article already cited, which appeared in the July issue of our *Archives*, Chibret recommends substituting *cyanide of mercury*, for the oxycyanide, since the latter will not always be furnished in a condition of perfect purity and, used in its commercial form, would injure steel. Remaining ten minutes in a bath of the cyanide of mercury, 1:100, suffices, according to this author, to sterilize the instruments. Then it is well to pass the instruments to a weaker solution (1:1500.) *

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[*] VINAY. *Manuel d'asepsie*, page 62, COURBOULES *thèse de Lyon*, 1883., KITT, *Centralbl. f. Bacteriologie*, 1888, Vol. III, page 573.

As will be seen, we are easily enough able to obtain asepsis, according to our present knowledge, as regards our hands, the instruments and the bandages.

The asepsis of the *field of operation* presents much more difficulty. Although the epidermis of the face (and notably that of the eye-lids) of the patient, his eye-brows, lashes, etc., endure as energetic a cleansing as the hands of the operator, this is not true of the mucous membrane, so easily irritable, that covers the internal surface of the lids and the external surface of the globe. This membrane forms, moreover, in the *culs-de-sac* the *plica semilunaris* and the lachrymal ducts, veritable receptacles for bacteria, † so much the more dangerous, since they remain in intimate and constant contact with the wound.

Steffan very justly remarks also, that the conjunctival sac, in which our operative wound is, is more difficult to protect against infection coming from without, than is the abdomen, because of its connection with the lachrymal sac and with the nasal and buccal cavities. The multitude of methods suggested for obtaining asepsis of the eye, and the complexity of their use, are the best proof of their insufficiency and of the uncertainty in which we still are, with reference to them.

It is difficult to reproach anybody for having permitted himself to be carried too far by antiseptic zeal, since we have not yet found a means of procuring assured asepsis of the eye; but I am convinced that we have often gone astray and, with the best intention in the world, done, in this respect, more harm than good. Thus those colleagues, who subject the eye to a thorough washing, with a sublimate solution of 1:2000, with 3% carbolic acid; who fill the conjunctival sac with iodoform, or with yellow ointment, after the operation, etc., incure the risk of provoking an inflammation with secretion, which seems to me to imply precisely the danger that it is sought to avoid.

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* Permit me to mention briefly, here, a few substances employed for the disinfection of instruments. They have been pointed out to us by colleagues, though we personally have not used them. Biniodide of mercury 1:20,000, (PANAS) ; a concentrated solution of salicylic acid, (Dufour) ; Salicylate of mercury, 1:5000, (Vacher) ; Hydronaphthol, (Swanzy) ; Resorcine (Englebienne) ; the permanganate of potash (Critchett) ; a boiling solution of soda, 1:100, (Dohnberg, Eversbusch, Schrœter). Besides the antisepsis, it may be well to examine the instruments, immediately before their use, by means of a strong, magnifying lens, as Eversbusch, Nordensen and others recommend. One thus discovers, not only defects in the cutting edge and in the point, but, moreover, the infinitesimal foreign bodies, that sometimes adhere to the instruments, in spite of the bath whence they have come.

† GAYET, CHIBRET, SATTLER, WIDMARK, HAAB, KUHNT.

Clinical observation teaches us that, in order that infection take place, there is necessary, not only the presence of bacteria, or of noxious substances, but also a soil propitious to their action. There exist, incontestably, inflammations and even suppurations, without bacteria, * and which none the less hinder, in the most annoying way, the healing of the wound. Now I have a strong feeling that, by treating the eye with irritant agents and manipulations, we start up the conditions that are propitious to all kinds of inflammation and infection; in short, to all pathological processes.

The confession of a skillful operator, who is, at the same time, an erudite bacteriologist, and who attributes to the irritating effect of a too strong antiseptic the loss of two eyes, upon which he operated for cataract, is, in this point of view, very significant. And has not Hermann† proved that, if he injects under the skin of a rabbit, either an aqueous solution of carbolic acid, or a sublimate solution, and then microbes, this suffices to provoke a notably less quantity of pathogenic germs, than when similar microbes are afforded an opportunity to act upon a tissue not previously subjected to an antiseptic injection.

Merely the manipulations, designed to cleanse the eye, but executed with too little care, may suffice to bring about a lesion of the protective layers of the eye and open ways for infection.‡

* LEBER.—*Die Entstehung der Entzündung. Leipzig*, 1891.

† *Annales de l'Institut Pasteur*, 1891, page 243.

‡ [illegible]. *Loc. cit.*, page 145.

It is well here, as everywhere, where our therapeutics still move in relative obscurity, to remember the adage, true as it is old: "*Τὸ δὲ πρῶτον τὸ μὴ βλάπτειν*," "*Primum non nocere.*" * We are to choose then, in the host of antiseptics, that have been recommended, that which is the most efficacious and at the same time the least irritating to the eye. And then it has always seemed to me that the advantage of the manipulations, that are undertaken with an antiseptic aim, is far from being due solely to the bactericide action of the substance used, but comes in great part from their *mechanical* effect, from the washing. Perhaps we do not kill as many microbes as we sweep away with the mucus, the secretions, the epithelial scales, the impurities of all sorts, sojourning in and on the lids, affording the microbes an asylum and favoring their development. †

My friend Sattler writes me that, after prolonged antiseptic bandaging with a sublimate solution of 1:5000, there detaches itself, from the conjunctiva, a fine pellicule that contains epithelial cells and a quantity of micro-organisms. It is for this reason that it is best to wash the eye generously and thoroughly, to rid it of all these dangerous substances, but to take great care not to introduce new ones or, as we have said, to provoke a condition of irritation or a lesion which may become the starting point of an inflammation, with or without bacteria.

It is impossible to mention here all the solutions employed with the aim of preparing the eye for operation. The most efficacious, and certainly the one most used, is that of the *bichloride of mercury*, 1:5000, originally advocated by Sattler. The most resisting bacteria seem to lose, in it, their vitality, in a few minutes. Moreover, the eye generally bears it well, especially when it is lukewarm, which augments still more its antiseptic efficacy. Panas recommends the *biniodide of mercury*, as being, in weaker solution, as efficacious as, and less irritating than, the sublimate at 1:5000. According to Chibret, the cyanide of mercury, ‡ in solution in water, 1:1500, added to 1:7000 of the chloride of sodium, has bactericide power equal to that of a sublimate solution of 1:1500. Moreover, this solution would be still less irritating, to the mucous membranes, than would a sublimate solution.

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* See also BARDE *comte rendu* of his clinic, for the year 1891, page 14.

† See DIANOUX, *Ann. d'oc.*, March 1892.

‡ CHIBRET. *L'antisepsie par le cyanure de mercure*, *Arch. d'opht.*, 1892, page 437.

Boric acid in saturated solution, especially extolled by Schmidt-Rimpler,* is particularly well borne, but its antiseptic action seems much inferior to that of the mercurial salts above mentioned. This solution seems to us, therefore, like that of the chloride of sodium, (6 or 7 :1000), or sterilized water, indicated rather for the mechanical cleansing of the eye, during and after the operation.

Other substances, by penetrating into the interior of the globe, would involve the risk, as we have above seen, of determining in it an annoying irritation. In order to prepare the organ for operation, one will need to consider first the *lachrymal apparatus*. The ducts are to be probed and cleansed very carefully, by means of repeated injections of an antiseptic solution. If any secretion indicates the presence of a lachrymal disorder, it is best to postpone the operation until a cure of this has been accomplished.

Many colleagues fill the inner angle of the eye, after the operation, with iodiform. The odor of this substance being very disagreeable, we use iodol instead. Haab obliterates the lachrymal puncta, by means of the galvano-cautery, and Deutschmann, by means of a few sutures, after section of the puncta, at the least threat of an affection of the lachrymal sac. The conjunctiva is to be not only bathed, but irrigated, protractedly, by an antiseptic solution.

Gayet uses, for that purpose, a blepharostat, whose hollow arms, pierced with little apertures, are placed in connection with a receptacle containing a solution of the sublimate, 1:6000. An irrigator, from which one throws the jet upon the everted lids, into all nooks and corners of the conjunctival sac, does this work well.

Gayet, Chibret, Kuhnt and others cleanse the conjunctiva thoroughly, besides, by means of a tampon of cotton, on a stylus and soaked in an antiseptic solution.

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* This author seems to now prefer chlorated water, for purposes of ocular antisepsis. (See *Deutsche med. Wochenschrift*, 31, 1891).

It is well to wash the conjunctiva, the night before the operation, and to leave the eye under an antiseptic bandage, wet (if the skin is not too sensitive) or dry, but aseptic, up to the moment of the operation, when the washing is to be repeated.*

It is incontestably due to these antiseptic measures, that we have just outlined, but which admit of many modifications—it is due to these measures, rigorously undertaken, that the cataract operation gives results, to-day, of which one would not have dared to dream thirty years ago. Professor Manz is justified in saying, that our failures no longer seem to constitute more than the inevitable allowance which must be made for the inherent imperfection of any human work. Is it necessary for us to stop there, convinced that we have attained all that is humanly possible? We don't think so.

As all admit, we still have a few complete failures, and then some half losses, or, as we call them, by euphemism, semi-successes, that are more numerous. It is permissible to hope, that we may yet be able to notably reduce the number of them, especially that of the latter, for, after the good, there is still the better, which, if it really merit its name, is not an enemy of the good. How shall we accomplish this further improvement? Bacteriology, especially in its application to surgical practice, is still making progress; we shall finally succeed in warranting our patients against noxious influences, in a way that will be, at the same time, simpler and more efficacious. We must not, however, expect *everything* from the future and, because of the unknown, forget what has already been acquired by science. Thus we are not to let ourselves be dazzled, by the success of local antisepsis, to such a point as to neglect the care to be given to the rest of our patient's body. It will always be repugnant, to the true surgeon, to operate on an unclean person, in a dirty place. Antisepsis is, as a matter of fact only cleanliness pushed to its ultimate extreme; nothing is, therefore, more justifiable, than to cause the patient to undergo a radical soaping, before subjecting his eye to the cataract operation. It is not rare that we thus make discoveries of the higest importance, from the etiological point of view as well as from that of special precautionary measures, to be taken during and after the extraction of the cataract.

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* Nuël remarks that, often, the non-operated eye shows itself more irritated than the other, and that its conjunctiva secretes, under the bandage, more than that of the operated eye. He attributes this phenomenon to the fact that a sound eye is generally less carefully cleansed than the one upon which we expect to operate, and that herein is found a proof of the efficacy of this cleansing. So he leaves each suspected eye bandaged for two days before proceeding to operate on it.

Our colleague in Japan, Inouye, preaches even by practicing, by taking, himself, and having his assistants take, a complete bath, before operating for cataract-extraction.

Since we know that hairs are the bearers of the predilection to infection, we have cut, when necessary, the eyebrows and, generally, the hair of the patient's head if it be too exuberant. Bobone has it shaved; Fuchs envelops the head in linen, soaked in an antiseptic solution. These are certainly excellent precautions, but we ought not to forget ourselves, in this antiseptic zeal. The observation of one of our friends, a most distinguished gynecologist, who has seen the statistics of his laparatomies noticeable bettered since he has taken to the envelopment of his head, with an aseptic cloth, during the operation, is very significant. Hence we can only applaud Randall, when he writes that he washes and brushes, not only his hands, but also his face and beard with soap and water, first, and then with Listerine, before commencing a cataract-operation.

If the fine statistics of Brettauer, and others who are forced to operate for cataracts in hospitals, with an evironment of suppurating wounds, prove that aerial contagion is not greatly to be feared, nobody will deny that the purity of the air is as important for our patients as is the cleanliness of their beds and clothes. Moreover, in spite of the jealous care that we take, not to abandon, to mercenary hands, either our instruments or our patients, we are not, however, the only ones who touch them, and how could we expect respect for antisepsis, from a personnel with whom the simple notions of cleanliness are lacking.

Finally, antisepsis and cocaïne, those two great acquisitions of modern surgery, often gratify in vain, with ill-deserved success, hands that would have abstained from touching a bistouri, at the epoch when the surgeon found all his salvation in the perfection of his operation. It remains no less true that the good operator will find his recompense in more numerous, and more nearly perfect, successes.*

RÉSUMÉ.

Cataract extraction has become, in this age, a much less dangerous operation than it formerly was. This progress is not attributable to changes in the operative method, but to a more profound acquaintance with the nature of the evil, which is due to the discovery of cocaïne, which, by the local anaesthesia that it effects, sensibly reduces the danger arising from the indocility of the patient; and is still more due to antisepsis, which conjures the much greater danger of the infection of the eye. This is not by any means equivalent to saying, as certain publications would have us believe, that, now-a-days, all cataracts may be attacked with impunity, with equal facility, and by the same simplified method. Neither cocaïne nor antisepsis nor anything else that may be hereafter invented, in the domain of surgery, will ever prevent there being considerable variation, in the opacity of the lens, that is given the common name of cataract. According as this is due to one or an another cause, as it is more recent, or older; harder or softer; smaller or more voluminous; as it belongs to one person or another, etc., the operations upon it will need to be different.

The dangers of this operation, have been considerably reduced, and that in nearly the same proportion for all forms of cataract. For senile cataracts, ripe and uncomplicated, they have become almost *nil*. This is why some have been able to adopt extraction, without iridectomy, and others to allow much liberty to their patients, after operation.

But incomplete or complicated cataracts, while often permitting extraction by the same method, are always entitled, in our opinion, to special precautions as to the operative methods, as well as with reference to the after treatment.

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* STEFFAN. *Arch. f. Augenheilk.* XXXV, 2, 1889, and *Klin. Monatsblätter*, XXVII, Oct. 1889, page 406.

Very far from seeking one sole method, and wishing to impose it upon everybody, under the name of the simple, or natural method, or that of Daviel, we shall seek, on the contrary, to modify our method according to the needs of the case, to adapt it to the nature of the patient, as well as to that of the cataract and to all the attendant circumstances.*

So we are to profit, not only by the conquests of modern surgery, but still more by the patrimony, so conscientiously and, often-times so painfully, acquired by our ancestors. And, with reference to the old masters, we specially hope that the admirable zeal, with which they sought perfection, in the execution of their operations, will not be allowed to cool.†

By observing as profoundly, by operating as perfectly as they, armed as we are, with marvelous resources, with which they were unacquainted, we cannot fail of the aim that humanity imposes upon us, of realizing, in the cataract operation, a last possible maximum of success, with reference to number as well as in perfection.

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* The late Sir Wm. Bowman wrote to me, but a short time before his death: "You are perfectly right, I never laid down a method of extraction, universally applicable; I aways in every case operated as seemed to me at the time best for the individual treated. I cannot doubt that the problem of what is to be accounted the best method, in any particular class of cases, will still have to be worked out by our successors, and by theirs too! but ever remainimg open to modifications, to suit the thousand personal circumstances of the patients."

† Our venerable Russian colleague, Waldhauer, who, for forty years, has practised our art, with a master's hand, attributes the dexterity, in cataract operation, that he has acquired, in great part to fencing, which he has always cultivated with ardor, as well as to the systematic operative exercise, that he has not ceased to practice on the eyes of animals, and human cadavers.

WHERE TO PLACE THE AXES OF CYLINDRICAL LENSES OF SPECTACLES IN CASES OF OBLIQUE ASTIGMATISM.

Written for the Ophthalmic Record by

N. C. STEELE, M.D., CHATTANOOGA, TENN.,

Prof. of Otology and Pharyngo-Laryngology in Chattanooga Medical College.

The most careful oculist sometimes finds difficulty in satisfactorily placing the axes of cylindrical lenses in spectacles to be worn by persons with oblique astigmatism.

Of course skill, time and care are the best safe-guards against errors, but, given these, there often remains a doubt as to the best angle at which to place the axis of the cylinder.

Dr. G. C. Savage, Editor of the *Ophthalmic Record* advances the theory that the reason for this is, in many cases at least, the rotation of the eye-balls by oblique muscles, and that the rotation is in order that the retinal images may fall on corresponding parts of the two retinæ, thus avoiding double vision.

In the first number of the *Ophthalmic Record* Dr. Savage elaborates and demonstrates his theory on this subject under the title of "The Harmonious Symmetrical Action of the Oblique Muscles in all Cases of Oblique Astigmatism."

To prevent as much as possible this rotation during the tests for astigmatism he urges that such eyes be tested one at a time under the full influence of a mydriatic, an opaque disc being placed in front of the other eye. For several reasons that is the advisable procedure, and I suppose it is the usual one with most careful oculists.

In those cases in which we are still in doubt as to the location of the best meridian, "at one moment the patient indicating that it is at a certain angle and, at the next moment, five or more degrees removed from that point," he says there is rotation of the eye-balls by the harmonious symmetrical action of the oblique muscles.

I accept Dr. Savage's theory, and think it a proof of remarkable scientific acumen, but have been somewhat disappointed that he has not given more definite instructions for getting the best practical results from a knowledge of his theory.

The only special rule he gives in the article referred to above for setting cylinders, is the following: "If the best meridian in hypermetropic astigmatism is in the temporal quadrant and there is doubt as to whether the axis should be at a certain angle or 5° or more nearer the horizontal, the latter point should be chosen."

This is correct when the best meridian in each eye is in the temporal quadrant, and the same is true of the nasal quadrant. It does not hold good however when the best meridian of one eye is in the temporal, and the other in the nasal quadrant.

I believe I can give a rule covering all cases of oblique astigmatism, and one which will serve as a satisfactory "working formula," even if the examiner does not understand Dr. Savage's theory.

It is well to remember that the "best meridian" in astigmatism, is that meridian occupied by the axis of the plus cylinder, which corrects hypermetropic astigmatism simple or compound; and occupied by the axis of the minus cylinder, which corrects myopic astigmatism simple or compound. Therefore I may, for brevity's sake, use the terms "axis" and "axis of cylinder," instead of "best meridian," and as practically synonomous with it; and when speaking of the axes of the cylinders, I shall for convenience, refer to the ends of the axes above the horizontal. Bear this in mind, as it is important.

Now, as to the rule. It applies to those cases only in which, after careful examination by the methods heretofore indicated, you are still in doubt as to the exact angle the axes of the cylinders should occupy in the spectacles. The rule is as follows: *In those cases in which the axes of the proper cylinders for the two eyes diverge, place the cylinders at those points which will give the axes the greatest divergence permitted by the tests;*

and in those cases in which the axes converge, place them at the points which will give them the greatest convergence permitted by the tests. To illustrate this rule, let us consider a few cases, all of oblique hypermetropic astigmatism.

Case 1. In the right eye you are in doubt between 105° and 115°, and in the left eye between 75° and 85°. According to the rule you give them the limits of divergence allowed by the tests. That is, you place the axis of the right lens at 115°, and that of the left lens at 75°.

Case 2. In the right eye you are in doubt between 75° and 80°, and in the left between 100° and 105°. In this case, the axes converge, and according to my rule you converge them still more; as much as the limits of the tests will allow. Place the right at 75° and the left at 105°. In both of these cases Dr. Savage's rule would hold good, although in No. 2, the "best meridians" are in the nasal quadrants.

Case 3. In the right eye the points of doubt are 115° and 120° and in the left 100° and 105°.

Although in the right eye the axis is in the temporal quadrant while in the left it is in the nasal quadrant, still they diverge, and according to our rule we make them diverge more; that is place them at the angles farthest apart; for the right eye at 120° and for the left eye at 100°.

Case 4. In the right eye the points in doubt are 95° and 100° and in the left 105° and 110°. As in case 3 so in this, the axis in the right eye is in the temporal quadrant while that in the left is in the nasal, but the axes in the two eyes in this case converge instead of diverge as in case 3. Therefore according to my rule we converge them more—as much as the tests permit. That is, we place the axis of the cylinder for the right eye at 95° and that of the left eye at 110°.

These four cases illustrate all kinds of oblique hypermetropic astigmatism.

In all cases of myopic oblique astigmatism simple or compound, reverse the rule: *converge* for *diverge* and *diverge* for *converge.*

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DR. LANDOLT AND DR. CULVER.

We are sure that every reader of the *Record* will feel indebted to Dr. Landolt for the thorough and exhaustive paper on "Cataract-Operation in Our Time" which he has given us. The source of the paper will insure its being read; and no one can read it without feeling enriched.

In like-manner all will feel under obligation to Dr. Culver, through whom Dr. Landolt has spoken in English. The translation is lucid, and has been accomplished at the expense of much time and labor on the part of Dr. Culver.

This paper on "Cataract-Operation" occupies 72 pages of the *Record*, and the author has adhered to his subject, having nothing to say of the etiology, pathology and symptomatology of cataract. The chapters on cataract, in our standard works on the eye, include all these, and yet we find everything said in from 20 to 74 pages (De Schweinitz, 20; Berry, 26; Fusch, 34; Schmidt-Rimpler, 35; Noyes, 36; Wells, 72; Meyer, 74). It is true that the page in most of these works is larger than that of the *Record*; but it is equally true that no where in English books or journals can so thorough and exhaustive a paper on cataract-operation be found as Dr. Landolt's paper, presented in this issue. The *Record* congratulates itself in having been chosen by the author as the medium of publication.

THIS ISSUE.

We regret that the appearance of this double number is a little late; but it could not be otherwise, because of the great amount of time and labor necessary for making a proper translation of Dr. Landolt's paper. And, too, after the translation had been made, the work of correcting proof was not a small consideration. Both the translator and the publisher were anxious that but few if any errors in either translation or typography should occur, to prevent which the proof was read twice by each of us. We both did what we could towards getting the issue out by Nov. 1st. For this unavoidable delay we ask pardon. In the future, as in the past, the *Record* will appear as nearly on time as possible.

We appreciate the fact that many, fearing their copies of the *Record* had been lost in the mail, have written us letters of enquiry.

DR. STEELE

Is very fortunate in the framing of his rule for placing the axes of cylinders in cases of oblique astigmatism. It is correct both theoretically and practically, and could not be expressed more clearly. This piece of valuable instruction can be readily stored in the mind of every oculist, and can be made to render practical service every day.

DR. CHAS. E. SAJOUS

Will spend the next two years in Paris, France, where he will continue the work of editing the Annual of the Universal Medical Sciences. Hereafter this valuable publication will be brought out in both English and French. In this way much valuable work done by American and English physicians will be brought to the knowledge of our French confreres, and *vice versa.*

DR. ARTHUR G. HOBBS

Has resigned his Professorship of Ophthalmology, in the Southern Medical College, Atlanta, Ga., at the end of twelve years of successful teaching.

DR. B. J. BALDWIN'S

Presidential address before the Ala. State Medical Association was on many topics; but the main thought under several of the headings was "higher medical education." The address has been neatly printed, and bound in stiff cover, and contains interesting information. Dr. Baldwin is known by many of the readers of the *Record* as one of the leading Oculists of the South.

It may be stated, in this connection, that all the Southern Medical Colleges will be represented in a convention of Medical Colleges to meet in Louisville, Ky., on the 16 inst., the object of which is to raise the standard of medical education, both as to the length of time of attendance on lectures and as to preliminary requirememts.

INSUFFICIENCY OF THE OBLIQUES.

For the benefit of those who are interesting themselves in the study of "insufficiency of the oblique muscles and how to correct them" I publish below cuts of frames which I have devised and used in my practice, prescribing same almost daily. The frames are made of steel with circular rims for lenses. These rims are deeply grooved to allow a free rotation of the lenses. The rims are marked at points 15° degrees apart, from 90° to 45°, in either the lower temporal or lower nasal quardrant, depending on the pair of muscles affected. The + cylinder used may be from + .50 D. to a 2.00 or even 3.00 D. as the quantity of insufficiency may suggest, and the axis of each is plainly marked as shown in the cuts.

The frames are not marked nor are the cylinders cut except at the Oculist's order. I find the most useful cylinder to be a + 1.50 D.

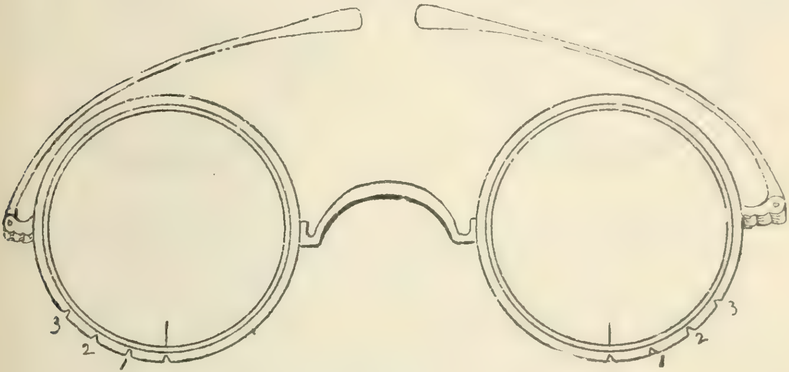

FIGURE 1.

Fig. 1 represents a pair of exercise cylinders ordered for a patient's own use whose superior obliques are insufficient. The rims, as shown, are marked in the lower temporal quadrant, at four points 15° apart, three of which are numbered 1, 2 and 3. The cylinders whose axes are distinctly marked can be readily revolved. The patient is directed to place the mark on each lens at the notch marked 1. Placing them now before her eyes she is instructed to look at a candle, lamp or gas-jet, 10 to 20 feet distant, for 5 minutes. Now the two lenses are to be revolved so that their marks coincide with No. 2 notch on rim. The flame is now looked at 3 minutes, when the last change in position of lenses is made by revolving their marks to notch No. 3, the point of maximum action. The patient now looks at the light two minutes, which ends the exercise for that day—10 minutes in all. *

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* This I have found better practice than I followed at first, viz. having the patient look an equal length of time for each of the three stages of exercise.

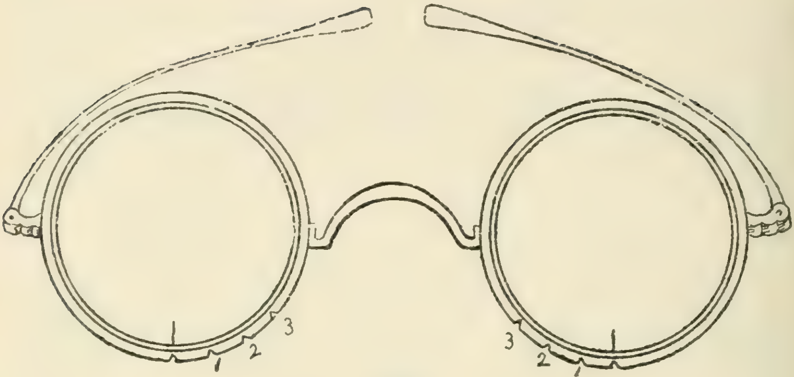

FIGURE 2.

Fig. 2 shows the marking of rims when the patient has insufficiency of the inferior obliques, the exercise lenses to be + cylinders. The revolution is made in the direction of the notching in both classes of cases. The points at which to stop and the time to look at the light are all the same. Insufficiency of the inferior obliques is far less common than that of the superior obliques.

For the information of those who have read my paper * on "Insufficiency of the Oblique Muscles and how to Correct them" I will state that the patient on whom I made the discovery of the treatment progressed to a complete cure. Many others have since been treated, after the plan laid down in this short notice, and with most gratifying results.

The whole question is a matter for demonstration and not for doubt.

◆

DR PRICE'S DEPARTMENT is entirely crowded out of this issue. Otology, Laryngology and Rhinology will be given a fair showing hereafter.

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* See *Ophthalmic Record* No. 1, Vol. 2.

THE

OPHTHALMIC RECORD.

VOL. II. DECEMBER, 1892. NO. 6.

ON THE ASSOCIATION OF SHIPPING DISASTERS WITH COLOR BLIND AND DEFECTIVE SIGHTED SAILORS.*

BY MR. T. H. BICKERTON.

Ophthalmic Surgeon, Liverpool Royal Infirmary.

LIVERPOOL, ENGLAND.

Mr. President and Gentlemen:—

Of the valuable recommendations, twelve in number, made by the Committee on Color Vision appointed by the Royal Society, none gave me greater pleasure to see than the last, which reads thus:—"that in case of judicial inquiries as to collisions or accidents, witnesses giving evidence as to the nature or positions of colored signals or lights should be themselves tested for color-and-form vision." Personally, I should have preferred to see this recommendation head rather than end the series, and for many reasons.

In the first place it could be acted upon at once and without necessitating any addition to the rules regulating the working of the Courts of Inquiry, and in the second place, if acted upon, even now, this recommendation would be the means of furnishing conclusive evidence of the paramount necessity there existed for the preceding eleven recommendations. I greatly fear that many a score of shipping disasters will occur before the Royal Society's suggestions become part of the law of the land, and when the preceding eleven recommendations have become law defective-sighted and color-blind individuals will be unable to enter the marine service, and thus this twelfth recommendation will be of little value compared with what it would be, were it to come into operation at once.

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* Read before the British Medical Association held in Nottingham July 28, 1892.

Throughout the long controversy which has existed between the specialists and those in authority, the one question invariably put by the latter, has been,—point out cases which have been proved to be due to color blindness or defective sight? For a long time this question could not be answered, because sailors on colliding vessels are not required to have their eye-sight tested, but we fortunately can now point to three cases where color-blindness or defective-sight was the sole cause of disaster.

The sinking of the steam-ship "Isaac Bell," involving the loss of ten lives, was due to the color-blindness of the pilot of the steam tug "Lumberman;" the wreck of the "City of Austin," causing a money loss of £40,000, was due to the defective-sight and color-blindness of the pilot (in this case tobacco was at the bottom of the deficiency) and the loss of the "Carbet Castle" was, so the owner told me, due to the color blindness or short-sightedness of the chief officer.

The obstinacy of ship-owners in refusing to admit color-blindness and defective sight as a possible cause of disaster, has been great. According to them the look-out men and officers on colliding vessels always have perfect color-and-form-sight, and the bad sighted and color blind men never come to grief.

Then, is it not a wonder that they do not always man their vessels with the defective-sighted ones?

One great reason for believing that bad sight is a potent cause of disaster is the fact that the Board of Trade, in tabulating the causes of marine disasters, make "causes unknown" account for so large a proportion; thus, in the Wreck Register for the year 1887, of 1,263 disasters, no less than 209 are placed under this heading. May not bad-sight have accounted for some of these? The American Board of Trade mentions that, between the year 1859 and 1886, there were 2,408 collisions, "accidents which it was impossible to avoid" accounted for 1,562, "error of pilot or captain" for 215, "want of observation or proper interpretation of the rules of the road" for 537, "undetermined causes" for 94.

Therefore, of 2,408 cases, at least 846 might have been due, I do not say they were, but might have been due to color-blindness or defective sight.

With regard to these accidents from unknown causes, we not unfrequently read remarks like the following, and I now quote from the "Times" of Feb. 5th, 1889: "A terrible calamity occurred in the English Channel on Sunday night. During fine clear weather, two vessels which had had each other in sight for at least a couple of miles, came into collision, and sank within fifteen minutes, leaving their crews struggling amid the wreckage in the sea. Of 42 men, 23 went down, and all would inevitably have perished, but for the presence of a tug on the scene. This is the third collision within a few weeks, and seamen had almost begun to look upon them as periodical and ordinary occurences, but the appalling loss of life has moved the seafaring population very deeply, and now there are some very strong comments upon their frequency."

All inquiries respecting the cause of this disaster lead to the same conclusion, that it was due to one of those astounding errors of judgment on the part of one or other of the navigators, which seems to defy all attempt at reasonable excuse. Each blames the other. But read in the light of our knowledge, and we have a simple and natural explanation of a so-called mysterious and unaccountable collision: and so long as color-blind and defective sighted men are tolerated in the mercantile marine, just so long may we expect to read of similar "mysterious and unaccountable" disasters.

Take again the following, appearing in the "Times" of August 20th, 1888—"It is admitted that the vessels knew of one another's proximity for several minutes before the one dashed into the other. The weather was not at fault, the sea was not unusually high, there was no fog at the crises; each saw the other approaching in time to put a mile between them, and yet, five minutes saw the whole tragedy played out and a hundred and five men and women have actually been sacrificed."

Commenting on this terrible disaster, we read, "But there ought to be some means of abolishing disasters like this of Sable Island from the list altogether." Here was neither recklessness nor calculated audacity, nor lethargy. All due vigilance seems to have been exerted and on both sides. But somebody, whether on board the Geisler or on the Thingvalle must be responsible, though probably no penalty can ever be exacted. But the rule of the road at sea itself needs to be brought to trial, if two well-found ocean steamers in ordinary Atlantic weather, with crews and officers reasonably on the look-out, can, either by its observance or its non-observance, find themselves suddenly locked in a murderous embrace. The rule ought to be so simple and unmistakeable as to render a collision in the circumstances of last Tuesday impossible.

"Controversies, of which our columns have frequently been the scene, prove that sailors, lawyers, and merchants have not, as yet, been perfectly successful in devising one adequately free from ambiguities. The awful end of the Geisler is additional testimony to their failure. The world has a right to demand of maritime experts rules on the subjects of collisions which only blind men or madmen shall be able to misunderstand or disobey."

Yes, gentlemen, the "Times" in this last sentence most unconsciously hit on the real cause of these terrible collisions due to so-called "unknown causes."

Let me read the sentence again, "which only blind men shall be able to misunderstand or disobey." Here, at last we have the truth the whole truth, and nothing but the truth. Sailors, lawyers and merchants have failed, while we, the ophthalmic section of the medical profession, have been crying in the wilderness for the last one hundred years.

Ninety-eight years ago Professor Wilson, of Edinburgh, wrote these prophetic words: "the apalling yearly list of lost vessels which appears in our Wreck Returns awakens the suspicion that more than one of these fatal disasters may have resulted from the mistaken color of a lighthouse beacon or harbour lamp which on a strange coast and with the accompaniment of a snow storm or a thick fog has been wrongly deciphered by a color-blind pilot."

Since then, the energies of many medical men have been directed to this subject, and have done their best to impress upon the authorities the absolute necessity there exists for allowing only those men to be sailors who have perfect far-sight and perfect color-sight, and yet in this year of grace 1892, we have to acknowledge that our efforts so far have been practically futile. True, we have the recommendations of the Royal Society and those of our own Association to point to, but I sincerely hope no member who takes an interest in this subject will abate one tittle of his endeavours. There are none so difficult to convince as those who will not believe, and the men who have had the framing of the "rules of the road at sea" are the very men who hitherto have turned from all suggestions on the eye sight question with contempt. True it is that their language, judged from examples to be found in the "Nautical Magazine" is becoming moderate and even polite, but they lack knowledge of this subject and they will require our best attention.

The present rule of the road at sea are the only rules for men who have perfect color and perfect far sight. Let the authorities make, as the "Times" asked "a rule so simple and unmistakeable that it can be understood by blind and color-blind sailors." When this has been accomplished we shall be content, but until then we must continue to press upon the public the following facts: that 4 per cent. of the whole population are color-blind; that about 8 per cent. more have marked impairment of sight from refractive errors; that there is no official test whatever as to a sailor's eyesight; that a man may be the subject of any of the forms of eye disease, may have any degree of blindness, or may be so short sighted as to be unable to see distinctly more than a few inches in front of his nose, and yet be at perfect liberty to be a sailor and to become an officer, and that although there is a compulsory color examination (in many cases a most inefficient one) to be passed before a sailor can become an officer, there is no check to a color blind man being a sailor or to his remaining one to his life's end.

One of the conclusions come to by the Royal Commission on loss of life at sea, was that, "it was the duty of the ship-owner to select competent officers and crew." What more incompetent men could be shipped than color-blind and short-sighted sailors?

Again, I contend, with all respect to the Commission, that the duty does not lie so much with the ship-owner, but with the Legislature whose first prerogative it is to provide for the safety of its subjects. What is the use of compelling ship-owners to provide costly life saving apparatus while, at the same time, they are allowed to take on board collision-making machines in the shape of more or less blind men.

It is a fact, that in spite of all the provisions made by Parliament in 1876, and the great increase of the staff of the Board of Trade entailing a very large charge on the country, there was not only no diminution in the loss of life at sea on merchants vessels, in the years following on this legislation, and up to the year 1883, but a considerable increase. It is not so difficult to suggest a cause, and very likely the correct explanation is to be found in the fact, that whereas formerly ships jogged along at a moderate speed, say six to ten knots, and ample time was given to those in charge to reflect on the possible consequences of porting and starboarding, of late years speed has greatly increased, and with vessels going at 16 to 20 knots and in command of defective sighted men, a very large increase in the death-roll is only natural.

One would have thought, that in the face of so many unaccountable disasters, a genuine endeavour would be made to discover the real cause, but that is the last thing our authorities aim at.

I am glad to find that there is a gallant and distinguished Admiral also of our way of thinking. This gentleman writing to the "Times" in the course of a long controversy, following a very fatal shipping disaster said, "I am alone in my glory here, for no one of those who have given advice to seamen has ever made the least attempt of a serious character to ascertain what are the real causes of collision. They all guess at them and then propose a remedy for the evil they have guessed into being."

This statement coming from one whose opinion is very highly thought of in high places, is of great interest to us. He evidently thinks he knows of one special cause of accident which has been overlooked. We think we know of another. If the gallant Admiral were to unite his forces with ours, might we not reasonably expect, that such a heading in the Wreck Returns, as "Causes Unknown" would be a thing of the past? At any rate I throw the suggestion out for what it is worth.

The "Times" has stated, and I think truly, that "the primary cause of casualities at sea, like those on road by shore, is either the reckless selfishness of persons in command, or the absence of a proper look-out" (Feb. 9th 1889). The first of these said causes, I am not prepared to discuss, but that the second accounts for a very large number of disasters, no one who reads carefully the Board of Trade Enquiries can deny, and I do not think I am presumptuous in believing that so long as the possibility exists of color-blind and defective farsighted men being chosen to act on look-out duty, no diminution in the number of shipping disasters can be expected.

I wonder how many passengers would go to sea, knowing that the look-out man was color-blind and the captain short-sighted, and yet there are gentlemen, leaders in their profession, who pooh-pooh our contention. One of them is Admiral Colomb, and he has, in my opinion done much harm, and has been a great power in preventing this subject of the color-blindness of sailors receiving the attention it deserves. I believe that the means recommended by the Select Committee for the prevention of loss of life at sea are and must remain futile so long as the very essential of safety, namely, perfect eyesight on the part of officers and men, is ignored. Admiral Colomb thinks differently, but, as I believe, wrongly, and I would have no hesitation in taking a popular vote on the point between us.

In the course of an able paper delivered by him on the subject of the Washington Maritime Conference, at the Society of Arts, and reported in the "Times" of March 28th, 1890, he made the following remarks:—

"As to the qualifications of Officers and seamen, the Conference (Washington) dealt wholly with the question of color-blindness on account of its danger with reference to the red and green side lights. He never knew himself a case of collision where color-blindness was in question. The statements were generally perfectly clear that wrong helm was given deliberately in the face of the color seen, and as no authoritative teaching had existed to show that it mattered what color was seen so long as danger was denoted, he had never been able to lay stress on the color blind question" Mr. Baden Powell, R. N. R., who followed in debate declared "that, in all cases of collision at sea, there was no default of the rule of the road at sea, but they generally arose from negligence. The rule of the road at sea was perfectly understood by intelligent men, and it was the 'lubbers' and the careless who did not act according to it." While Admiral de Horsey considered "collisions at sea were caused principally by three faults—a bad look-out, ignorance of the rules, and neglect of the rules."

In his reply, Admiral Colomb expressed his opinion that "collisions at night occurred through the helm being ported to the green light, and starboarded to the red, and he could not agree that the collisions occurred wholly through negligence, for he thought that they largely occurred because our seamen were not taught what they should do, and collisions occurred through ignorance."

Now we know that there are a number of well authenticated cases were disaster due to color-blindness and to defective sight actually occurred, or was narrowly averted, and it is surprising Admiral Colomb does not know of them. I would also ask whether Admiral Colomb knows of a single case out of the thousands that have occurred where, after collision, the color sight of the officers and men were tested by an expert.

Would it not be well if Admiral Colomb were to eliminate this cause before denouncing it? One might have thought that, as in most shipping enquiries, the evidence as to the color of the lights, and as to the distance at which they were first seen is bewildering in its contrariness, the first step towards a solution would be to examine on the spot the far sight and color sight of the witness: but those who adjudicate at these enquiries think differently, and take it for granted that the witnesses coming before them have perfect far sight and perfect color sight.

I believe that if the eye-sight of sailors on colliding vessels were tested in court the cause in many cases would be found neither in ignorance nor in negligence, nor in "lubbers", but in the color blindness and defective sight of the officers and men on watch. And in opposition to the opinions of the above eminent Naval Authorities and in strong confirmation of my belief, I will quote the opinion of an officer, who, at the time of the loss of H. M. S. "Vanguard" (which loss I have in a previous number of the *British Medical Journal* reported and traced to the defective sight of a look-out man) was on board H. M. S. "Warrior."

This gentleman writing to the "Liverpool Daily Post" Feb. 23rd, 1889, expressed himself in the following terms:—

"Is it reasonable to believe that steady married seamen with families depending on them, and who have had years of experience, suddenly lose all judgment and common sense, and steer their vessels on clear nights, sometimes in broad daylight, so as to deliberately ram each other, thereby losing their lives and ships, and the lives of the passengers? Surely not? In none of the other professions or callings can we find anything approaching a parallel case; therefore, in some cases their eyesight must be defective."

If Admiral Colomb would only take the trouble to examine personally a color-blind officer, I feel sure that this subject would have in him a distinguished convert, and an able and powerful advocate.

That our judges and those who adjudicate in shipping cases do think, though erroneously, that the sailors and officers doing look-out duty are specially picked men, receives negative proof by the fact that they never have ordered an examination even in a case where there has been direct contradiction as to the color of, and distance at which, a light was seen, and receives positive confirmation by a judgment delivered by Sir, now Lord, James Hannen in 1888. Lord Hannen said "a good look-out was not kept on board the 'Essiquibo,' but it is to guard against the defects, not merely of men's sights, but of their minds and attention that the rule was framed." I venture to think Lord Hannen gave credit where it was not due. The framers of the rule scarcely believing in the existence of color-blind sailors, and not at all in short-sighted and blind sailors, cannot have appreciated the dangers of employing either, nor, I venture to think, would their successors be in any more enlightened condition, were it not that Dr. Farquharson's action in the House of Commons has been the means of directing public attention strongly to them.

For the first time in the history of Board of Trade Enquiries the representatives of the Board of Trade did take, in February last, official notice of a condition of affairs, to which I have frequently called attention, and which amounts to little less than a public scandal.

In concluding their report, upon the stranding of the Steamship "Violet," they said:—"there is one circumstance which the Court wishes particularly to call attention to. After the close of the inquiry, and the respective certificates had been given up in the usual way, it was subsequently found that the mates certificate bore the memorandum in red ink, 'This officer has failed to pass the examination in colors. (Signed) J. Clark Hall, Registrar-General.' On the face of it, and without some explanation, it seems a most undesirable and reprehensible thing that a Master's certificate should be granted to a man who is apparently unable properly to distinguish colors. The danger of entrusting the command of a vessel to such a man is too obvious to need further comment. And, assuming that a correct register of certificates granted be kept, then the Board of Trade's solicitor conducting the inquiry should have been instructed on the point, in order that he might bring to the notice of the Court the fact, as under certain circumstances, it might have had an important bearing upon the subject of the investigation. (Signed) Wm. M. Angus, James E. Woods, (Justices) A. Anderson, E. Brooks, (Assessors)." Such condemnation of the Board of Trade is well warranted and well deserved, and I hope all interested in the subject, will make every use of this quotation, for it deals a death-blow to the existing regulations, and to the masterly inactivity of the Board of Trade on this subject.

Though the time has not yet arrived when we may relax our vigilance there is occasion for much congratulation. The recent popular movement towards reform was due to a member of our profession, Dr. Farquharson, M. P. The Royal Society Committee on Color Vision due more or less directly to Mr. Brudenell Carter, and before whom our President, Mr. Priestley Smith, gave valuable evidence, has published a series of conclusions, bearing out in every particular those contentions which we have urged for years passed, while the indefatigable and praiseworthy exertions of Dr. George Mackay of Edinburgh, the honorary secretary to the Committee on the "Efficient Control of Railway Servant's Eye-sight" has added a whole chapter of facts to our knowledge of that subject, and has indicated the necessary reforms.

But the official mind is only just awakening to a sense of its duty, rules and regulations have yet to be made, and it behoves us to watch carefully that these rules and regulations are carried out in accordance with our views. Only when this has been done may we rest, but we shall then be able to point with intense gratification to a bright page in the history of the Medical Profession. The long roll of victims, due to a preventable cause will be diminished; there will be increased confidence in those who go down to the sea in ships, and we shall have earned the lasting gratitude of the entire population of the world.

88 Rodney Street.

THE REGION OF THE MACULA LUTEA IN OPHTHALMOSCOPY.

Written for the Ophthalmic Record by

M. F. WEYMANN, M.D.,

ST. JOSEPH, MO.,

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"As an additional matter we mention the fact that it (the macula) is visible only in a certain number of cases in the form of a little speck marked off from the rest of the fundus by its dark color (Meyer, German edition 1886, p. 17)."

"The origin of the macula is skirted by large retinal vessels which give off numerous twigs toward its center, though none o them can be seen quite to reach that point. In many cases nothing but these indefinite characters mark the yellow spot, but in some, especially in dark eyes and in young patients, a minute bright spot occupies its center and is encircled by an ill-bounded, dark area, round which a peculiar shifting, white halo is seen. This minute spot is the fovea centralis (Nettleship 1890, p. 74)."

"There is a spot of darker color and more granular than the surrounding fundus, uncrossed by any visible retinal vessels bu toward which the finer branches of larger twigs radiate, fringing its boundry. This region is the macula lutea. Its center is occupied by a small bright spot (fovea centralis) (De Schweinitz 1892)."

"The appearance of the region of the macula is most variable In young persons it is characterized by the presence of a ring with iridescent reflexes, the image of the macula. The color o the fundus is darker and in the center of the circle greyish brown. Sometimes a whitish point, sometimes a small red spo is seen like a hemorrhagic speck with a central white point (Chauvel, Examen de l'oveil, p. 353)."

"The center of the macula lutea is prominent by reason o its red color, whose center often appears as a whitish, round, o sometimes hook shaped, spot.

"Frequently the position of the macula is indicated only b the tapering vessels running to a common center, while othe signs are wanting. (Schweigger Hand-book Ophth., p. 414)."

"A small spot or a figure corresponding to two sides of a acute angle, with a central light spot. The central white spo comes from the fovea centralis acting like a concave mirror (Schmidt-Rimpler, 1889, p. 119)."

De Wecker in his great Traite' d' ophthalmologie, comprisin four volumes, does not *allude* to the subject at all.

From the preceding extracts it is plain that the description o the macula lutea is a sadly neglected subject among ophthalmologists. It seems hardly possible that such a condition of thing could have continued through several decades characterized b the most untiring efforts in the exploration of the fundus. However, when we consider that one text-book after another repeats to the student the discouraging fallacy that the region of central vision is most difficult to see and that, even after a proper location of the spot, the observations are usually unsatisfactory, we must not be surprised at the systematic neglect of its study. Another cause for this indifference lies in the fact that the macular region is seldom of importance in a diagnostic respect.

For several years I have given special attention to this subject and my findings have caused me to examine every patient under my care for the last twelve months. Besides, I have made numerous observations in some of the public institutions of this city. As a first condition for success in this work I must state that mydriasis is absolutely necessary, which is best obtained by homatropine. The light should be on the side of the eye examined and a shade (square piece of tin on a stand does well) be placed between the head of the patient and the light, the latter being well swung back. The method of examination should be the direct one.

Observation of the preceding precautions will often show things otherwise invisible.

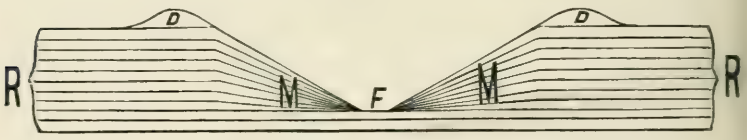
It is true that in *old* persons frequently the spot cannot be found in spite of the greatest efforts. This is, in the majority of instances, due to the clouding of the media incident to old age. The physiological sclerosis of the lens plays quite an important role in obscuring the view, and the senile changes in the retina and choroid also contribute their share. *Among children it is practically impossible to find a subject where careful search does not show up the macula distinctly.* The same can be said of young people, while failure during the prime of life is a rarity, provided always that the media have the normal transparency. I am aware that this statement differs from the general teaching, but I shall presently point out the source of failure in these observations.

Anatomical examination shows that the region of the macula is marked by a small papular elevation in the center of which we find a crater like depression known as the fovea centralis.

At the bottom of the latter we notice that of the 10 layers of the retina only two remain. These outer two layers are known as the epithelial zone of the retina and are the end-plates, as it were, of the optic nerve. This place being the spot of acute vision where all visual impressions are copied and transmitted to the brain, loss of light must be avoided. For that reason the conducting apparatus of the remaining 8 layers has been reduced to a minimum, while all the necessary fibres are radially crowded aside. As we leave the macula, the other layers regain their original thickness in gradually recovering their normal measurements. In this manner a sort of conical depression is created.

Around its margins an elevation is formed by the peripheral fibres returning from the neighborhood of the meridian in which the macula is situated. Instead of passing over the point of central vision, they diverge in order to join again after winding around its walls. In this manner the macula acquires a projecting rim, giving it the appearance of an exulcerated papule. Ordinarily the sloping walls do not meet at the bottom, but leave a small circular base, known in anatomy as the foveola foveæ.

FIGURE 1.



R. Thickness of retina.

D. Papular elevation due to returning peripheral fibres embracing the macula.

M. Conducting layers (8 upper) gradually thinning down to expose F directly to light.

F. Base of crater, known as faveola foveæ.

We all know that the red glow appearing in the pupil on ophthalmoscopic illumination is not derived from the retina. The latter, in health, is transparent and applied against the middle coat of the eye, the choroid. The latter is made up, roughly speaking of an outer layer of veins of all sizes including the afferent arteries, while the portion turned toward the retina consists of very fine and uniform capillaries, intimately united by pigmented connective tissue-cells

From this coat, known as the chorio-capillaris, comes the red reflex. The macular region is especially rich in capillaries, hence the deeper hue of that neighborhood. On account of the retinal transparency we should not expect to be able to see its substance during illumination. Still there is one place where this is possible.

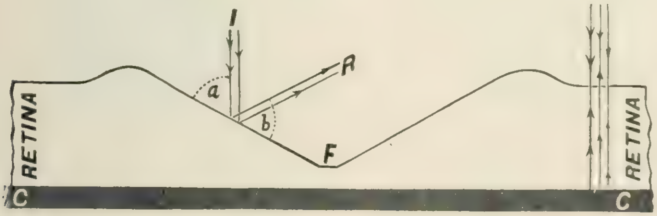
In order to be seen by us an object must send rays of light to our eyes. We notice the red reflex of the chorio-capillaris, because the light thrown into the fundus of the observed eye returns to our own retina For such a return the light must be almost in the same line with the rays thrown in. Deflected rays would miss the pupil and hence be retained.

Again, while perpendicular lines readily pass through a transparent medium even without refraction, strongly inclined rays are reflected instead of passing through.

Go by a window and you will see the things behind it, when in front of it. As you move on and the angle diminishes the view becomes gradually indistinct, finally disappears and in its place you see the window glass.

Standing before a picture we may not be able to see that it has a protecting plate. Step back to one side and the glass will become visible.

FIGURE 2.



C. Choroid.
F. Foveola foveæ.
I. Incident rays.
R. Reflected rays.
A. Angle of incidence.
B. Angle of reflection.

Fig. 2. shows the optical occurrences which make the slope of the macula visible. It will be noticed that the incident light cannot return, because, the angle of incidence equalling the angle of reflection, the light is scattered in the fundus. Diffused rays, of which some reach our eyes, illuminate the slanting portion of the retinal tissue and show it in a yellowish-white color

However, the very presence of sloping walls would make them visible, for the greatest quantities of light are received by surfaces at right angles to the impinging rays, while sloping surfaces lose in brightness in direct proportion to the amount of inclination. Now, it is just exactly this difference of illumination which enables us to distinguish different objects and to form the idea of perspective in our mind.

The visibility of transparent substances at greatly inclined angles increases with the resistance offered to light. Translucent objects are, therefore most easily noticed.

Now, the retina is not transparent in the sense of glass, for its structure is not homogeneous Microscopists can easily demonstrate this by showing the various layers of the retina without staining fluids. It is, at best, translucent.

It might be compared to a very delicate skin or, still better, to a fine sheet of soft rubber. Experiment will easily demonstrate our theories.

A surface painted red and covered with wax paper will show red in an imitation eye as long as the rays impinge upon it at right angles. At a sufficient slope the paper cover becomes visible.

There is another *incontestable* proof of my assertions. It is a clinical fact that in detachment of the retina the latter becomes visible at the place of separation. Its sloping surface presents a grayish white reflex, differing from the red of the fundus.

In detachment the vascular supply is not disturbed. Occasionally re-application ensues, which also shows that detached portions are healthy, at least for some time.

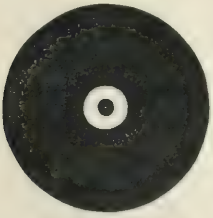
Speaking of the appearances of the macula we have to call attention first of all things, to the variability of its images. The most frequent form represents a red dot surrounded by a whitish ring. The latter is created by the sloping walls, while the dot in the center stands for the *foveola foveæ* (first form.) This form (I) is found in 75 to 80 % of children not over 14 and very nearly as often in young people up to the age of majority.

After that it becomes less frequent. I want to say here that I supplemented the material of my private practice by examinations in schools and in the House of the Friendless. Some old people (above 50) I was allowed to examine at the State Insane Asylum No. 1, situated near St. Joseph.

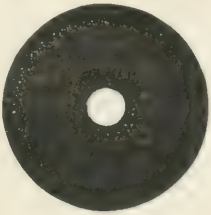
The second form represents a white ring, more or less elliptical and without the central red dot. Here the sloping walls of the macula meet at the bottom. (Fig. 1.)

A form directly derived from the preceding is a narrow linear space of whitish color. The walls are here very much compressed laterally, whence the linear appearance (third form).

Sometimes the walls are quite high in one place and low at the opposite point. Here a half-moon or a horse-shoe, or any of the numerous intermediate appearances, result (fourth form).



I.



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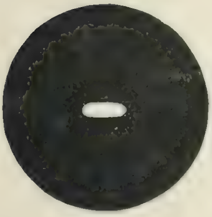

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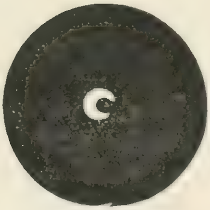

IV.

NOTE.—No. V is too variable and difficult to represent.

Unusual flatness of the walls enlarges the spot and presents a uniform redness. Very often the red has the appearance of a strawberry. Occasionally minute white dots are seen here and there, but the ordinary whitish reflex is wanting on account of insufficient inclination (fifth form).

All these varieties occur, but very often they are artificial products. This is especially true of Nos. 2 and 5. Careful correction usually develops them into 1. In fact, the error may be easily produced, for having No. 1, and putting a wrong lens before our eyes, we will at once notice that the outlines become indistinct and the central spot disappears. Not only that, poor correction will in some instances create absolutely unreal images.

I had for a long time wished to meet the case described by Prof. Nettleship as a shifting halo. Sometime last year a young lady consulted me for a small button of episcleritis on the inner side of the corneal border. As usual I subjected her to a dark room examination. I adjusted my opthalmoscope until the optic papilla was as perfect as I could possibly wish it. I next directed her to look at the light in the mirror. How great was my surprise and how delighted was I when I saw that mysterious shifting white "halo." Indeed it did shift! with every movement of the mirror, with the slightest tremor of the eye. The best description I could give would be to liken the restless reflex to a quivering spark of light as drawn from a small static machine. I looked and examined until I was satisfied I had thoroughly observed this form of macula. Presently my prosaic inquisitiveness awoke. I turned my lenses and, alas! the pretty stranger had disappeared. First it changed into an ill-defined white patch, next a fairly well formed horse shoe took its place and finally form I, as described before, was seen in all its beauty and perfection.

It should be remembered, then, that a lens which shows a well defined papilla is not necessarily adjusted for the macula. Occasionally this is the case, often, however, the focus is shorter. In several cases an addition of 2–3 D. is necessary to bring into view the region of central vision. Roughly, 1 D. would shorten the focal distance in the average eye $\frac{1}{3}$ mm. hence such extreme differences would indicate that the visual axis may be as much as 1 mm. shorter than a line passing from the papilla through the center of the lens.

This fact also shows that oculists, who pretend to measure the refraction by means of the ophthalmoscope to within $\frac{1}{2}$ D. in *all* cases, are not very particular observers; for fixing a vessel, or the papilla, they do not necessarily obtain a correct focus on the macula. Of course, $\frac{1}{2}$ D. may in many cases be a sufficient allowance, but by no means in every instance. In fact, I have often felt surprised that sometimes I could find almost the exact refraction with the ophthalmoscope, while at other times I was mistaken from 1–1½ D. It now occurs to me that the most exact work is to be done with the macula as a "*point de repère*."

Another peculiar observation is the fact that the macular appearances described under 5 become more frequent as age advances. It occurred to me that in the course of time the macular excavation gradually flattens. I do not know of any anatomical data in favor of this assumption, but I expect to inquire into that matter as soon as I find time. Appearances indicate that the process mentioned actually does take place.

The forms under V are quite rare in childhood, but become frequent in middle-aged people. This alone shows that changes in the macula must occur between those ages.

Flattening of the slope would abolish white reflexes, since, with an inconsiderable inclination, the incident rays strike the retina almost at right angles which would cause the ordinary red reflex. The red of the shallow crater would be in direct connection with the increased hue of the macula in general, tending to enlarge the appearance of that spot, at least seemingly. Observation shows that to be so.

Gradual flattening of the foveal crater also would furnish an easy explanation for the invisibility in old age, even with slight turbidity of the media.

CONCLUSIONS.

1. Except in very old people the macula lutea is easily visible in the *vast* majority of all persons with perfectly transparent media, provided the observer be thoroughly familiar with the direct method and examine under mydriasis only.

2. The typical form of macula presents a red central dot surrounded by a circular band of whitish color. The red center corresponds to the foveola foveæ; the white ring, to the fovea or the walls of the crater.

3. The macula needs special adjustment of the ophthalmoscope, since it is usually nearer to the observer than the papilla optica.

4. Secondary (or atypical) forms should not be considered

real until after careful focusing. The observer will be surprised to find that such forms more often develop into a perfect No. 1 than retain their first appearance.

5. If in a healthy eye the macula presents an indistinct appearance, it, very likely, also shows a false image and should be focused correctly.

6. The foveola (red central spot) may be absent, if the slopes are steep and meet at the bottom.

7. The white band may be incomplete owing to the small size (or absence) of the slopes in one direction. This occurrence is quite rare, the corresponding picture being usually resolved into a No. 1, with correct adjustment.

8. Whenever the macula is recognized only by its deeper red and the radiating vessels, its appearance may vary a great deal; a classification is impossible on account of the great irregularity.

112 South Eighth Street.

◆

REPORT OF A CASE OF FOREIGN BODY IN THE CHOROID AND RETINA WITH RETENTION OF GOOD VISION.

Written for the Ophthalmic Record by
C. D. ROY, M.D., Atlanta, Ga.,
From the University Clinic of Prof. Sattler, in Leipzig.

The following case, occurring in the University Clinic at Leipzig, is one of considerable rarity and for various reasons is one of much clinical interest.

Otto——age 6, was brought to the Clinic by his mother on Aug. 2nd, of this year, on account of an injury received the day before. While hammering a piece of steel, a particle was thought to fly off and strike the child in the right eye although no foreign body could be discovered.

Status præsans:—The right eye on inspection is slightly congested. No pain is complained of. On closer inspection a wound 1½ mm. from the limbus cornea and 1 mm. in length could be seen on the temporal side of the sclera. Slight pericorneal injection. Pupil dilated ad maximum. Fundus and media, on ophthalmoscopic examination, quite clear and apparently normal. A few hazy streaks could be seen in the corpus vitrei. $V = \frac{5}{10}$.

Aug. 3rd, ciliary injection quite prominent. Very little pain. By ophthalmoscopic examination high up in the fundus a red mass of about 3 or 4 mm. in breadth could be distinctly seen. In the center of this was a dark spot and by very close observation was readily diagnosed as a piece of steel. The red mass was a blood clot from hemorrhage into the choroid. Localized hyperæmia of the retina and choroid were also noted. There was slight haziness of the vitreous body. Lens was perfectly normal, the foreign body evidently not having touched the same.

Aug. 6th, $V = \frac{5}{10}$ w + 0.5. No material change.

Aug. 8th, blood clot is disappearing, leaving pigmentation. $V = \frac{5}{10}$ w + 0.50. Patient complains of no pain and there is scarcely any inflammatory reaction in the eye.

Aug. 10th, $V = \frac{5}{10}$ w + 0.50.

Aug. 17th, $V = \frac{5}{10}$ w + 0.50. Vitreous is now quite clear.

Aug 22nd, $V = \frac{6}{6}$ w + 0.50. Pigmentation remains. The foreign body is more or less encapsulated in the retina.

Sept. 24th, $V = \frac{6}{6}$ without glass. There is still pigmentation at the point of injury but otherwise the eye is perfectly normal.

The treatment throughout consisted in atropine instillation. Warm formentations to the eye and general regulation of the systemic condition. In many respects the case is interesting and very unique in character.

The ease with which the foreign body penetrated the tough sclera; its passage by the lens without injury to the same; the small amount of irritation occasioned by its presence, and the perfect vision which finally resulted with the body still in the eye, add much to the interest of the case. Throughout the treatment the patient complained of scarcely any pain As would naturally he expected a small scotoma in the lower field of vision resulted from the injury to the retina. It is now three months since the date of injury, and the vision with the general appearance of the eye is seemingly perfectly normal. The piece of steel is still distinct though partly encapsulated. In looking over the literature of the subject, I find 16 cases published of foreign body remaining in the eye, generally with retention of useful vision. In my search I am sorry my time did not permit me to make it more exhaustive, etc.

I must acknowledge my indebtedness to an article by Prof. Knapp, in Knapp's Archives, 1883, from which I gathered the literature of the subject up to 1883. In this article, Knapp reports 12 cases as having been published up to that time The first three were by A. v. Græfe (Knapp's Archives Vol. III) where small bits of metal had penetrated the eye to the inner tunics, remaining free and unencapsulated. They produced some hemorrhage, but no oblation of the retina. From the point of the foreign body was a small scotoma but otherwise useful vision was recovered.

The *fourth* was by Jackson (v. Græfe's Arch. 1865, Vol. IX), a small bit of stone which passed through the cornea and lens, remaining free in the fundus near the papilla. Cataracta tramuatica followed which was removed, and with lens correction useful vision resulted. Scotoma. $V = \frac{1}{8}$.

The *fifth* case was by Jacobi (v. Græfe's Arch. Vol. XI). A piece of iron 0.75 mm. wide entered the eye, the sharp end remaining stuck into the retina. Became encapsulated. Lens was intact. Vision of $\frac{20}{20}$ resulted.

The *sixth* case by Hirschberg (1874, Klin. Beobachturgen). A small piece of metal passed through the cornea, iris, lens and vitreous and remained imbedded in the retina, not far from the optic papilla. Did not become encapsulated. A year after the injury the vision was $\frac{3}{200}$ on account of some opacity of the lens.

The *seventh* case was also by Hirschberg (1875, Berlin Wachenschrit). A splinter of iron lodged in the fundus occuli with one end free in the corpus vitrei. There existed a circumscribed scotoma $V = \text{Sn. } 1\frac{1}{2}, 7''$, eight months later.

The *eighth* case by G Strawbridge (Trans. Am. Opth. Soc. 1878). The head of a small iron pin pierced the sclerotic and imbedded itself in the fundus or little way from the papilla. The vitreous was full of moving opacities. No irritation in either eye, $V = \frac{20}{90}$.

The *ninth* case was by O. Siegel (Jahresbericht für 1876). A small piece of percussion cap entered the eye and remained imbedded near the macula. The irritation in the eye lasted but a few days $V = \frac{5}{18}$. Seeing defect near the point of fixation.

Tenth case by Dr Briere (Annals d'occulist., 1877). A small piece of steel entered the eye and was distinctly discernible in the fundus. Severe irido-cyclitis followed the injury. Under treatment the eye rapidly grew better and finally no signs of changes could be seen, save the encapsulated foreign body. A year latter, $V = \frac{20}{50}$.

The *eleventh* case is by S. Schnell, of Birmingham (Lond. Opth. Hosp. Reports, 1878). A small piece of steel passed through the sclerotic and lodged in the retina near the papilla. Only a small atrophic spot with a small black body in the center remained. Patient read Jager No. 1, and V. was even as good as with the uninjured eye.

The *twelfth* case by Hirschberg (Knapp's Arch., 1880). A small bit of iron pierced the sclerotic and imbedded itself near the papilla in the retina. Small scotoma existed. $V = \frac{15}{200}$.

The *thirteenth* case is by Knapp himself. A small piece of iron passed through the iris, lens and vitreous and imbedded itself in the retina with one end free in the vitreous. Circumscribed scotoma existed, $V = \frac{20}{20}$. Ten weeks later the eye was still in a good condition. Knapp also makes mention of a case occurring in his clinic during his absence. It had not been published.

The *fifteenth* case is by Dr. Hosch (Knapp's Arch. 1889). Was consulted by the patient for defective vision. Several months before a small piece of steel had struck her in the eye, the physician not being able to discover any foreign body and no irritation of the eye having resulted, the accident had been forgotten On examination a small linear scar in the cornea was formed as well as a perforated spot in the iris. By the ophthalmoscopic examination, a yellowish white body with glistening borders could be seen projecting from the retina and with pigmentation of a small area of the fundus surrounding The rest of the fundus was normal. $V = \frac{12}{200}$.

The *sixteenth* case is by Dr. A. Elching (Knapp's Arch., 1890).

Patient while working at his business was suddenly struck in the eye by a small piece of iron scale. On ophthalmoscopic examination, a brownish black plaque in the neighborhood of the macula could be readily seen. In the center of this yellowish brown mass, could be seen the black foreign body. $V = \frac{6}{24}$, atropinized, w. $+ 1.50^{c}$. The body became encapsulated, no further trouble with the eye was experienced, save a circumscribed scotoma; and with a $+ 0.75$ patient had a vision of $\frac{6}{12}$. These are all the published cases which, in the limited time at my disposal, I have been able to find. I wot not but that there are other cases especially those unpublished and trust that this article may prove an incentive for the publication of the same.

Leipzig, Germany.

UNUSUAL EFFECT OF JEQUIRITY IN CHRONIC TRACHOMA.

Written for the Ophthalmic Record by

R. C. HODGES, M.D.,
GALVESTON, TEXAS.

Since my first trial of jequirity, I have had a most unbounded respect for the remedy and have avoided its use as far as possible. During the past winter, in my clinics at the John Sealy Hospital, a great variety of cases of Trachoma presented themselves for treatment. For purposes of comparison and for instruction of students in attendance, I selected three cases for treatment by jequirity. The results were so satisfactory, and the effects so unusual and the method so different from that ordinarily employed, that I report the cases.

All authorities advise that a perfectly fresh preparation of jequirity be used, and that from one to three instillations of the infusion be made, rubbing it well into the conjunctiva. Not having any fresh infusion at hand, I tried first a solution, probably 3 or 4 years old, prepared by Parke, Davis & Co., but still in original package, wrapped and sealed.

Case No. 1. Mr.——, Laborer, age 50. Physical condition: very anæmic, chronic trachoma and pannus both eyes, stenosis of canaliculi, on both cornea several small excavated ulcerations. V = counts fingers with difficulty at 4 feet. Condition had existed for four or five years Patient had been under treatment at intervals during most of this period. On admission to hospital, we began the use of iodide of silver, but being such a typical case for jequirity, we decided to use it.

Both canaliculi were freely opened, washed out with 1 to 20,000 biniodide solution for several days and patient given general tonic and nutritive treatment. Beginning with left eye, I applied the jequirity infusion, 1 to 3 of water, freely rubbing it in. At the end of 24 hours, no reaction presenting, it was again employed. The next day the same application, with full strength of the infusion. Twenty-four hours later, or after third application, there was slight irritation of conjunctiva, some mucous discharge, but no swelling of lids, but both eyes looked better. From this time on the infusion was dropped in the eyes daily for seven weeks, every day bringing marked improvement in condition, until the conjunctiva became smooth and normal, the cornea clear and vision greatly improved. After the first week I used the jequirity in the right eye also with exactly the same results, and dismissed patient at the end of six weeks.

Case No. 2. Age . Right trachoma, pannus very thick, slight entropion with distichiasis. The jequirity was used in this case precisely as in first one, and during its use the distichiasis treated by depilation and canthoplasty. The results were highly satisfactory. The third case was one of trachoma, with however no corneal complication. The jequirity was used for three weeks with considerable improvement, but was finally abandoned for the iodide of silver, under which treatment he rapidly recovered.

My reasons for citing these cases in detail are first, to call attention to the fact that jequirity was used in one case seven weeks daily; one, six weeks; third, three weeks and at no time was there any inflammatory action more severe than in a simple acute catarrhal conjunctivitis. Second, the result in two cases was all that could be desired and all that is ever accomplished by the use of a fresh solution and the most violent inflammation. My conclusion from these cases, which I hope to re-inforce by further investigation, is that the curative effect of jequirity is due to some principle in the jequirity not yet recognized and isolated, and not to the destructive action of the violent inflammation it excites. The time was when I hoped to see a specific for this disease discovered. I continue to use in my own practice, with gratifying results, iodide of silver, but I do not forget that cases have their individual peculiarities and that no one rule of treatment can apply to all cases.

In my hospital work this year, where I have the best of assistance and facilities, trained nurses, etc , I shall continue my investigation and report results later.

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A CASE OF SO-CALLED HEMORRHAGIC GLAUCOMA.

Written for the Ophthalmic Record by

F. C. HOTZ, M.D., Chicago, Ill.

In January 1889, a negro, 70 years old was admitted to the Illinois Charitable Eye and Ear Infirmary, with occlusion of the pupil of L E. (result of acute iritis four months previously). Shallow anterior chamber. T. + 2: and violent ciliary neuralgia. January 29th, iridectomy upwards under cocaine. Though the eye was very sensitive (the repeated application of cocaine evidently having no effect), I succeeded in excising a large piece of the iris. The T. was decidedly lowered after the operation, but the wound was very slow in healing, and it had scarcely closed when the T. rose again and the paroxisms of violent pain returned. A second iridectomy (downward) in chloroform narcosis (February 20th), was followed by a violent irido-choroiditis and the sufferings of the poor patient were so intense that I was compelled to enucleate the eye on March 12th: the enucleated eye opened by an equatorial section exhibited a cataractous lens; a cloudy yellowish vitreous; a very deep glaucomatous excavation, and a fundus thickly speckled from the papilla to the ora serrata with numerous blood spots, a part of them being dark and old, another part of them bright red and fresh.

On the 18th of March, the patient left the Infirmary, but at the end of April he was brought back almost blind. A few days previously the sight of the R. E. (which we had frequently examined and found normal) had suddenly failed. He had perception of light only; the media were clear too, but the neighborhood of the papilla and the region of the macula were dotted with numerous small hemorrhages. I watched this eye very closely and made frequent tests of its tension. Some of the blood spots were absorbed, new ones appeared and the retina became quite cloudy (œdema) but all through the month of May, T. remained normal, and the patient had no pain. And this condition continued till the 12th of June, when without any warning, a violent storm of ciliary neuralgia set in and the eyeball showed a stony hardness. Eserine had no effect, and the iridectomy performed in narcosis (June 14th) was followed by a severe inflammation. I was afraid this eye too would have to be enucleated, but fortunately the storm subsided, the neuralgia ceased; and the tension remained normal as long as the patient stayed in the hospital (July 20th), but the sight never returned.

It had been stated by Von Græfe. Pagenstecher and other observers that there was always an interval of from several weeks to several months between the appearance of the retinal hemorrhages and the glaucomatous attack, and that there really existed no causative relation between the two conditions, but that it was more likely that both, hemorrhages and glaucoma, had a common origin in a morbid state of the blood-vessels (arterio-sclerosis). But as occasionally the opinion is still upheld that the glaucoma was directly due to the hemorrhages, I felt warranted in reporting this observation. If the hemorrhages were the local cause of the glaucoma attack, we should certainly expect to find the intra-ocular tension disturbed directly or within a few days after the retinal hemorrhages occurred. But when my patient returned to the Infirmary with the hemorrhages in the right eye, I closely watched this eye just for this one purpose, to see how early I could detect any change in the intra-ocular tension. But for six weeks frequent and careful tests failed to detect any disturbance of the tension, when, without any premonitory signs, the acute attack burst out with all its fury. This plainly shows that the glaucoma is not induced by the hemorrhages, nor these by the glaucoma, and that the name "hemorrhagic glaucoma" is not a very good designation for these cases.

◆

EUROPHEN.

Among the New Surgical Dressings Europhen seems to have quietly taken an elevated position as a positive and complete substitute for iodoform. It seems probable from recent investigations that we must rely upon some form or combination of iodine in order to secure a perfect, local antisepsis. The reports tend to coincide as to two or three very considerable advantages possessed by Europhen. The chief of these lies in the fact that the iodine component of Europhen is given off slowly, thus presenting fresh, or nascent, iodine to the tissues, and maintaining the healing process. A further advantage in this slow development of iodine is, that it prevents the possibility of irritant or toxic action. This is why large denuded surfaces, like burns or scalds, may be fully covered with it, and not give rise to any untoward effect. Europhen, in fact, appears to be especially adapted to extensive lesions, since its covering power is five times greater than that of iodoform, while its odor, though faint, is sufficiently well characterized to neutralize the peculiarly disagreeable fragrance attached to all surgical dressings. We note that recent clinical articles in approval of Europhen in the dermatoses, traumatisms and ulcerations, as also in specific lesions, have been written by Drs. Allen, Chappell, Shoemaker, Giles, Fernandez, Gilbert, Eichler and many others, who have extended the uses of Europhen to ophthalomology, gynecology and rhinology as well as the needs of minor and general surgery.

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We have had so many urgent calls for Vol. 1 of the *Record complete*, from oculists in this and foreign countries, we have decided to reproduce No. 1 of the volume, which has been out of print a long while. To do this without loss we must have at least 100 more requests than have been received up to date. Any one desiring the complete volume at the regular subscription rate ($2.00) will please notify me so that I may know how many copies to reproduce.

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BOOK NOTICE.

Fuchs' "Text-Book of Ophthalmology," as translated by A. Duane, M.D., of New York, and published by D. Appleton & Co., will make a most valuable addition to the library of any one interested in the subjects treated. The style of the author is easy and pleasing; and so clear are his expressions that no one can doubt his meaning. In the main he is correct in his teaching. On the subject of pterygium, however, there are not many who, having had good opportunities for observing, will agree with him that this growth has a pinguecula for its starting point;

and that it "occurs only in elderly people." In this country, and still more markedly so further south, it is very commonly found in young and middle aged people. In fact when seen in an old person, the history of the case will show that it has existed many years.

Fuchs' chapter on "Diseases of the Conjunctiva," covering 92 pages, is unsurpassed in any book. More than half the book is devoted to those diseases whose existence and nature can be determined without the aid of the ophthalmoscope, and is, therefore, a book well suited to the general practitioner of medicine.

In this short notice it is not possible nor, in this case, is it necessary to review every chapter; but, before closing, it may be said that the chapter devoted to "disturbances of motility of the eyes," while containing much that is good and true, is not a complete exposition of what is known at the present time. The fact is that the most useful knowledge pertaining to the ocular muscles has not yet been perfectly incorporated in any text-book. In the light of recent investigation a *new* chapter will have to be written even on the so common condition, strabismus.

ENGRAVING AND PRINTING.

Nashville can boast of the largest Engraving and Printing establishment in the South—indeed there are few houses in the East or West which can rival it in size or volume of business. The Brandon Printing Co,, occupy a six story brick house, on the corner of Union St., extending from Market to Front Sts. They have a thoroughly equipped, modern establishment and can do all classes of Engraving, Printing and Blank Book work. They also have a large Stationery department, and in addition are the general Southern agents for the sale of the justly celebrated Smith-Premier Typewriters. We cheerfully recommend this house to our readers.

Department of Otology, Laryngology and Rhinology.

GEO. H. PRICE, M. D., EDITOR, 621½ Church Street,
NASHVILLE, TENN.

THE USES AND ABUSES OF COCAINE
WITH REFERENCE TO
MUCOUS MEMBRANES ESPECIALLY.*

BY ARTHUR G. HOBBS, M.D.,
ATLANTA, GA.
Ex-President of The American Rhinological Association, Member of the American Medical Association, of the Georgia State Medical Association, the Atlanta Society of Medicine, Etc.

Since I received my first 20 grains of the hydrochlorate of cocaine (a part of the first two drachm package that arrived in New York), I have used many ounces; perhaps, altogether, by myself and assistants, as many pounds as my original package contained grains.

It will not be amiss for me to say in the beginning that I now have very different opinions of its uses, from those I entertained during the first years of its advent. However, one of my original opinions of its applicability has only become more and more confirmed with my increased use of it; and that is that its utility is principally confined to its local application to mucous membranes.

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* Read at the 10th Annual Meeting of the American Rhinological Association, September 20th, 1892.

The softer the mucous tissue to which it is applied, the sooner is its effect reached and the less the quantity necessary; and, as a consequence, the quicker and more decided is the toxic effect when its application is persisted in to this extent.

The general symptoms, however, are, everything else being equal, much oftener present in proportion to the area of membrane surface involved, than in proportion to the strength of the solution applied. Hence, sprays of a weak solution are liable to produce toxic symptoms, when much stronger solutions can be applied with a saturated cotton probe or wad, to a limited area, almost with impunity.

The constitutional effects of cocaine are manifested by a feeling of faintness—it may be even to the loss of consciousness—a trembling of the limbs, a pallor of the face, etc., any or all of which may appear in one minute or in fifteen minutes after the application to a large surface. Again, these symptoms may be produced by a small quantity of a one per cent solution in one individual and not in another; even if in the latter both the strength and quantity be ten times multiplied I have never yet reached a conclusion as to the average amount of cocaine that is necessary to produce the constitutional symptoms; neither do I ever know, the first time I use it, how to estimate the individual's susceptibilities.

Every individual seems to be a law unto himself as to the quantity necessary in his own case to accomplish complete local anæsthesia; and even in the same person the amount will vary at different times, with no apparent cause. Under similar circumstances I find it impossible to reach a complete local anæsthesia, in some, short of the toxic symptoms; when in others, one-tenth of the amount and one-tenth of the time will render the application of a galvano-cautery absolutely painless

To obviate the unpleasantness and delay caused by the constitutional symptoms, it is my custom to administer a stimulant of brandy or whisky at their first indications, and make the operation quickly and, always under such circumstances, painlessly. When it is found by trial that one bears the drug badly, it would be well always to give a stimulant before the second application is made.

I am sure that the last thousand galvano-cautery operations I have made would represent a much greater per cent that were absolutely painless, than the nearly three thousand cauteries that preceded. Perhaps this has been due to my greater familiarity with the technique of cocaine applications in the more recent cases.

In some, its effects in the superior pharynx are peculiarly distressing, more especially at the first application, but less and less so afterwards. However, it is well to remember this and avoid it, when making local applications above, by not allowing the solution to gravitate from the cotton plug.

The time necessary for cocainizing a mucous membrane is perhaps as indefinite as the strength of the solution; both due to that unknown quantity—the individual. Approximately, however, four to ten minutes and a four to a ten per cent solution for a small surface may be regarded as an average. If the intention is to produce the effect over a small surface only, as in galvano-cautery operations, a concentrated solution—ten to twenty per cent—should be used, and the result expected in four to eight minutes.

If, however, a general turgescence of any membrane should suggest the use of cocaine, then a spray of a very weak solution—a one or a two per cent—should be expected to accomplish the desired result in one or two minutes. In either case, the general effects may appear without any warning and mar the anticipated good results or, at least, render an otherwise easy operation, tedious and unpleasant.

It has been my custom, from the beginning, to make my solutions at the moment I use them and to vary their strength according to the case, and as I use no weights or measures, I never know, only approximately, the strength. The range is so great that I hesitate in stating it, as I have not space to give my reasons for sometimes using a one grain to the minim solution, and again, only a one grain to five hundred minims. As a general rule, however, the strength should be in inverse proportion to the surface to which it is applied. Since my many disappointments with ready-made solutions of cocaine, during the first few months of its advent, I have never risked any solution that had not been recently dissolved.

In case it should be necessary to dissolve a large amount, it would be well to add boric acid for its preservation, in a proportion of about one grain of the latter to ten grains of the former.

For safety, it is best to supply the drug instead of giving the patient a prescription to have filled and bring with him for an appointed operation. The operation will thus be less magnified in the patient's mind and he will be less liable to familiarize himself with the proportions and uses of the drug, should the temptation to use it himself arise afterwards. For these reasons, I do not, in any instance, give a patient a prescription containing cocaine as its leading ingredient.

As an ingredient in sprays, I find it abused more, perhaps, in hay fever prescriptions, than anywhere else. This is true also where it is prescribed in the form of powders for this disease.

The turgescent condition of all the mucous membranes of the upper respiratory tract, especially in the nasal turbinates, that is always present in hay fever patients, is so quickly palliated and rendered bearable, that the temptation is great to prescribe cocaine in some form for the patient's own use; but it is a dangerous experiment and one to be ventured upon only in exceptional cases.

During the past few years I have seen many journal articles that claimed for it a decided aphrodisiac affect, while my observation have been universally to the contrary. It will not be departing too far from the subject if I mention the effects of cocaine (through the mucous membranes) upon two cases of priapism, notwithstanding the fact that the results in these cases were reached through the general systemic impressions of the drug. The two young men, who were the victims of this rather unusual disorder, came under my observation by accident, and at intervals of about three years, each came to my office in a carriage for a coincident nasal and pharyngeal inflammation. Cocaine dissolved in vaseline, together with a small quantity of camphor-mentholine, was sprayed into the nasal and pharyngeal cavities to the great relief of all the unpleasant symptoms in these regions.

But this was not all. In the first case, to my surprise and to the patient's great joy, the other and more painful malady disappeared within ten minutes. In the second case the symptoms were almost exactly like the first, and the patient's delight was greater than my surprise, as I was this time anticipating a similar result from the same treatment. The relief of the priapism, in both cases, remained permanent.

In both instances, the usual treatment for such cases had been resorted to apparently without any result for 24 and 36 hours respectively, only to be completely relieved by a cocaine spray used upon a distant mucous membrane for a coincident malady. It would seem that in these cases cocaine acted as an anaphrodisiac, and it should not be surprising when we remember that its primary effect is to reduce a turgescence of the turbinates, and that these tissues are analogous in many respects to the erectile tissues that are involved in priapism.

I desire here to emphasize most decidedly one contra indication in the use of cocaine as a collyrium, and that is that *it should never be used when an abrasion of the cornea exists;* nothing in the form of a collyrium is more deceptive, as it is also most greatful to a denuded corneal surface.

The cornea is covered with the epithelial layer of the conjunctival mucous membrane only; here no middle layer proper exists whence it can derive its nutrition, hence it quickly loses its vitality when subjected to this local anæsthetic. So also the outer layer of the cornea, receiving its nutrition by imbibition only, seems to be even more susceptible to the destructive effects of cocaine.

I have seen a number of cases, during the last few years, (especially since this drug has been introduced into general use) in which the cornea has been greatly damaged by its constant and frequent introduction, for no other purpose than the temporary relief of pain; but unfortunately the relief thus produced proves to be a delusion, and the destruction produced upon the cornea is only masked for the time by the anæsthetic effects.

I have especially seen these bad results in the cases of physicians who had themselves persisted in its use for the comforting effects to their own eyes, both during the presence of foreign bodies on the cornea and after their removal.

Cocaine is contra-indicated also in any corneal inflammation and should not be prescribed beyond the acute stage of any form of conjunctivitis.

I have had but little experience in its use beyond its local application to mucous membrane surfaces, because I have never believed that its range of utility extended any further, except, perhaps, in a very few instances; hence I know very little of its general usefulness hypodermically, as it has usually seemed to me to be quite as painful to introduce it in this manner as the pain of a minor operation would be, especially when we consider the limited quantity that can be borne when it is introduced so directly into the circulation. I have sometimes, however, injected the solution into the tonsilar mass to hasten anæsthesia, but the toxic effects follow so quickly after its introduction into the circulation in this manner, that I always hesitate to resort to this means in an untried subject. Yet, in some operations on the eye, as in tenotomies, iridectomies, cataract operations, etc., I frequently use the syringe for introducing a weak solution—one to two per cent—subconjunctivally, in subjects that do not succumb to a four to six per cent solution applied superficially for fifteen to twenty minutes at short intervals.

In preparing for a tonsil amputation, I use a cotton probe saturated in a five to a fifteen per cent solution, and apply it to the whole surface of the mass at once; then I send the patient to a waiting room and perhaps in the meantime—about eight or ten minutes—see another patient; than make a second thorough application and wait three to five minutes before I use my knife and hook tonsilotome.

Occasionally, in an extremely sensitive patient who has not by this time exhibited any of the general effects, a five per cent solution may be introduced into the tonsilar mass with a long hypordermic needle before proceeding to amputate.

In nearly five thousand tonsil amputations (four-fifths of which were done under cocaine) I have never had a dangerous hemorrhage and not more than a dozen cases that even proved to be troublesome from this cause.

Undoubtedly, cocaine exerts a decided hæmostatic effect upon hypertrophic tissue, especially when it has thoroughly saturated the mass before an incision is made. Yet, after the solution of continuity, its blood-staying qualities are not equal to many other hæmostatics, and it cannot be relied upon for this purpose.

During the first years of its use, this drug was vaunted by many writers in the medical journals as a great panacea—as *the sovereign remedy* for ear-ache, but, naturally, disappointment followed quickly in the practice of these theorists, who seemed not to remember that the outer layer of the membrana tympani was not a mucous layer, else they failed to remember the fact that an aqueous solution of cocaine could be only sparingly absorbed through a cutaneons epithelium.

After the rupture or incision of the drum membrane in an acute catarrhal inflammation of the middle ear, when it becomes possible for the solution to reach the membrane involved, the call for relief from pain has already ceased. When it is practical to introduce a few drops of a strong solution into the middle ear cavity through the eustachian tube, the pain is usually relieved at once; but as it is not always possible to do this on account of the swollen mouth of the tube and as another question arises here beyond the scope of this paper, as to the advisability of the trial in any case, cocaine cannot be regarded as so great a panacea in ear-ache as it was first claimed to be by many who wrote only upon faulty theoretical grounds.

I have occasionally heard of cocaine habitues, all of whom were physicians, but I have had no personal experience with these unfortunates. Such cases will be found to be linked with the whisky habit in the great majority of instances.

I think, however, that we should always remember the danger of such a consequence when making a prescription containing cocaine and be guarded when even its suggestion arises.

Like all drugs that are potent for good, cocaine is also potent for evil. Like fire, it is a good servant but a bad master.

ABSTRACT OF A PAPER ON

AN IMPROVED GALVANO-CAUTERY SNARE; ITS USE IN THE NOSE AND THROAT.*

By HANAU W. LOEB, A.M., M.D.,

St. Louis, Mo.

Professor of Diseases of the Nose and Throat, Marion-Sims College of Medicine; Laryngologist to the Missouri Pacific Hospital and to the Missouri, Kansas and Texas Hospital; Surgeon to the Nose and Throat Department of the Grand Avenue Free Dispensary.

After commenting upon the great necessity of improvement in the galvano-cautery snares now in vogue, and, after stating the shortcomings of such instruments, the writer presented his own snare as one which could be kept clean under all circumstances.

In this instrument the insulating material is rubber which can easily be removed from the canulæ, while in the older instruments a covering of thread or silk which, once soiled, is always unclean, constitutes the insulation. The canulæ themselves are easily removable and hence are just as readily cleansed.

To obviate the great length of platinum wire which all other snares necessitate, the writer has added a little device which consists in passing two stout copper wires through the canulæ. Each wire contains a little eyelet in its flattened end, through which the platinum wire is inserted and the ends bent so that, when the wire is pulled into the canulæ, they cannot escape. There is less inconvenience in threading the little eyelet than in passing the wire through the old canulæ. An ivory tip, similar to those already in vogue, completes the instrument.

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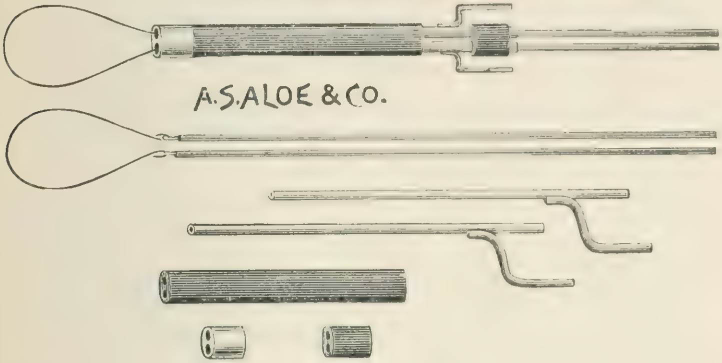
* Read in the Section of Laryngology and Otology of the American Medical Association, June, 1892.

The snare is applicable to the slide handle made by the McIntosh Battery and Optical Co., from whom as well as from A. S. Aloe & Co., St. Louis, Mo., the snare may be procured.



The following are the advantages of the instrument:

1. Cleanliness. Every portion is removable, the rubber insulator, the two canulæ, the two copper wires, the platinum wire and the ivory tip; it is therefore easy to treat them as is ordinarily done with all surgical instruments.

2. Less expense. The platinum wire is not so frequently broken and, when it is, it may be replaced at a trifling cost.

3. The instrument is firmer and therefore more easy of manipulation.

4. The current required is undoubtedly less.

5. There is no danger of short-circuiting the current.

As to the range of application of his snare, Dr. Loeb stated that in the removal of tonsils it was specially of service. Tonsils in all conditions of hypertrophy, except when thoroughly impacted between the pillars of the palate (even then a small portion may be removed), are excised with more precision and with less danger or inconvenience than by any other method, while the pain and time required are not increased. The tonsil is drawn out from between the palatal pillars by means of forceps and the snare is engaged so that as much of the tonsil is removed as is desired or desirable. Ear-pain and inflammatory reactions are no greater than after the tonsillotome operation.

To remove the uvula the snare is pleasing. The uvula is allowed to drop into the loop, the wire drawn tight, the current turned on and the uvula removed, no forceps being necessary. Less pain follows this operation than that with the scissors or uvulotome, apparently because the forceps or forks of the uvulotome draw down the mucous membrane so that more of the mucous membrane is cut away than of the muscular tissue, whereby a considerable portion of the latter remains exposed, making an exquisitely painful stump.

In the nose the snare is indicated wherever the old forms could be used, for the removal of polypi, portions of mucous membrane and of the turbinated bones.

The writer also stated that he had his cautery points covered with rubber instead of with thread, by which is overcome the objectionable lack of cleanliness.

The article was concluded by the comment "quod erat demonstrandum," the writer's observation upon the following communication received from the McIntosh Battery and Optical Co.

"The snare is certainly possessed of advantages over the ordinary forms, notably among which are greater ease with which it can be cleaned, economy in platinum wire and less amperage required in heating. This latter feature showed very plainly when testing yesterday and to-day a new device for the use of the Edison current in galvano-cautery. Twenty amperes of current would not satisfactorily heat the ordinary form of snare, ten to fifteen brought your snare to the proper heat."

303 North Grand Ave.

THE

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RESECTION OF THE OPTIC NERVE.

BY DR. ROHNUR,

Translated for the Ophthalmic Record by

L. WEBSTER FOX, M.D.,

PHILADELPHIA, PA.

In the *Annales D'Oculistique* for April, Dr. Rohnur, of Nancy, gives the history and details of an operation he performed after the method suggested by Dr. De Wecker. The subject has been so carefully gone over, and the criticism so keen, that I shall give to the readers of the *Record* Dr. Rohnur's article in full. He says: Having had occassion to perform some resections of the optic nerve after the method recommended by Dr. De Wecker, I have observed in one of my patients a repetition of the sympathetic symptoms which I believed had stopped, but the patient was not lost sight of and I had the opportunity to follow the case nine months after the operation; the symptoms which developed, were not only difficult to arrest but have left disturbing results to the function of the sympathizing eye.

August P., age 48, presented himself at the clinique April 17, 1891, with the following history: Five years previously he noticed that his right eye became red and the sight insensibly diminished on one side: he had no pain, and in six months he lost the sight. About three weeks later he suffered great pain at the back of both eyes and the vision in the left eye began to weaken, the patient then complained of having a constant mist before this eye and also of seeing numerous floating specks. The case now is, that the right eye is neither painful, nor sensitive to pressure. There is an intense peri-corneal injection, the cornea is very opaque, the globe very red, total synechia of the pupil, commencing atrophy of the anterior portion of the eye-ball. The left eye presents slight peri-corneal injection, the conjunctiva is red, iris deformed, globe sensitive to pressure, the fundus clear and appears healthy. On April 19, under chloroform a resection of the optic nerve was performed on the right eye. The right internal rectus was severed, laid back and the optic nerve caught with a right angled strabismus hook, drawn forward and cut as far back as possible from its attachment to the globe, then the anterior end seized with a forceps, and the eye-ball rotated which brought forward the ocular end of the nerve which was cut off. The eye replaced and the muscle re-attached—The nerve cut off was fully six millimetres in length. The operation presented no difficulty, but soon after there was a slight prominence of the globe. Iodoform and a compress bandage was applied. April 20, the day after the operation, the patient complained of great pain in the operated eye. The left eye is free from pain on pressure but still presents a slight peri-corneal injection. During the night the patient had some sub-orbital pains, the mist has disappeared but the specks still remain. The right eye is the seat of considerable chemosis, the ball is very red, the cornea opaque and full of pus, hypopion; the exopthalmia has disappeared. Warm compresses and washings of boracic acid applied.

In the left eye were floating specks; the dilated pupil showed an adherence at its lower margin. April 27, the right eye is still in the same state, the left eye improved and no pain, since using the atropia, the mist continues, vision one-third. April 29, no change in the right eye, slightly painful on pressure, floating opacities again in the left eye, a dulness or dimness is feared in the vitreous from the inequality of the pupil. May 6, all the inflammatory phenomena are accentuated in both eyes. Enucleation of the right is made.

May 8, there is still, in the left eye, a slight conjunctival redness, but much less intense: the eye is not painful and vision one-half.

May 26, the condition is stationery, every three or four days a hypodermic injection of 1 to 1000 of corrosive sublimate is given and the improvement is rapid, for by the 19th of June the eye is neither red nor painful. Six weeks later, the same inflammatory phenomena appear again: the injections of sublimate are renewed but this time they fail to stop the evil, later iridocyclitis developing and I was obliged to perform an antiphlogistic iridectomy, which now (Oct. 1) arrests all symptoms, but the visual acuity is reduced to one fourth by reason of the deposits, which the synechiæs had left on the anterior capsule.

One sees now that in this case resection of the optic nerve has been powerless to stop the progress of the sympathetic ophthalmia. After a passing improvement of very short duration, the sympathetic ophthalmia continues and enucleation of the eye was unavoidable.

In October 1890, Dr. De Wecker again proposed the resection of the optic nerve, previously performed by others. Several papers have appeared on this subject, some in favor and others against the operation.

Mackenzie, in 1844, was the first to suggest that the inflammation was transmitted by the optic nerve but he did not practice enucleation. White Cooper, however, suggested it in 1853 and Pritchard was the first to put this suggestion into practice in 1854. Optico-ciliary neurotomy was first proposed by Rondeau in 1876, and performed by Boucheron in the same year, which was soon found insufficient. Meyer proposed at the Congress in Milan (1880) a resection of a part of the ciliary nerves and of the optic nerve, which in its turn had been practiced two years before by Schweigger and Pfluger and others.

Then followed the observations of Deutchmann who, in giving to sympathetic ophthalmia an infectious origin, and in showing that transmission was through the lymphatic sheath of the optic nerve, reversed the nervous theory. Schweigger followed by severing the optic nerve close to the orbit, also the superior and inferior muscles, and by this means to dislocate the posterior end of the eyeball, in other words to prevent a transmission of the microbe by continuity of nerve tissue. Pagenstecher performed resection in 1885, not severing the oblique muscles nor suturing the palpebral opening as practiced by Schweigger.

Pagenstecher's method has been published by Scheffels: this surgeon, after having cut the optic nerve, rotates the eye-ball and denudes by snips of the scissors the posterior pole of the eye-ball. The methods followed by Schweigger and Pagenstecher present the following difficulties, first the proptosis caused by post-ocular hemorrhage and second, there is fear of the eye-ball becoming phthisical by the great dislodgment. Such are the prospects which smile upon those following these methods. Finally to avoid these difficulties Dr. De Wecker proposed, in 1890, his method which is but a modification of Schweigger's who claims that the one disputable ground is the connecting link between the two eyes—the lymph channel.

By reason of this we need not refer to the ciliary nerves, nor to attachments to the posterior part of the eye-ball, the capsule of Tenon (Schweigger). It is only necessary to speak of the one lymphatic channel going from one eye to the other, in a word the resection of the optic nerve, pure and simple, is the only matter we wish to discuss.

It is not necessary to follow out Dr. De Wecker's lines of operation exactly; he employs some special instruments, of which the most useful, although not indispensible, are the right angle strabismus hook, which seizes the nerve and draws it forward without allowing it to escape, and then the compress scissors which in cutting the optic nerve prevents, by their blunt peripheral edges, hemorrhages from the central artery. Both instrument and method of operation have been described by De Wecker himself and his pupil De Luzarey.

Let us recall an observation of Dr. Trousseau, recently published and the thesis of my own pupil Marchal, from which we borrow some of the details relative to the question, and also a short paper by Kalt. We shall not refer at this time to the observations of Schweigger, Pfluger and Clausen, but we shall have something to say about them a little later. The case which we are going to report is not the only unsuccessful example which has been noticed after resection of the optic nerve performed with the hope of preventing sympathetic ophthalmia, amongst the advocates of this operation who report their cases we note the omission of an essential point which is the perfection of the cure by time. The cases have been looked after for about 25 days, they have left the hospital perfectly cured in the operated eye and with no abnormal appearances in the other, but may one affirm that all sympathetic symptoms have entirely disappeared ?

The following case reported by Dr. Trousseau is the *Reveiu General* of *opthalmolgie* that such an affirmation was hazardous, also shows very clearly how little value one should give to observations published prematurely.

The left eye of P. L., age 38, had been the victim of serious traumatism several times: a wound caused by a stone 6 years previously, then, 18 months after a serious complication arose, brought about by the puncturing of the globe by a vine shoot. These troubles yielded to an intervention of which we need not recall the details, after what was lost of vision, all was again restored to order, then came a long period of calm for three to four years. On December 2, 1890, a violent cyclitis in the left eye was discovered and, on December 12, a resection of the optic nerve was performed. The right eye watered from time to time but otherwise was perfectly healthy and the vision normal The following March the patient returned to the hospital with the right eye red and vision decreasing and on March 21st, enucleation of the left eye was found necessary. At the back of the globe some little bloody clots and a quantity of serous liquid were found; the cavity was cleansed by an injection of sublimate solution.

The condition was very serious for five days after and then began to improve, the iris dilated well and the flakes diminished. By the seventh of April the fundus became clear and the visual acuity rose to one third and in three days later became one half. Such may be the true history of many resections supposed to be satisfactory but which have terminated in enucleation.

Marchal declares in a thesis that the statistics give no cases unfavorable to resection and it is remarkable to find but a few cases similar to that of Trousseau. Pfluger says, however, in one case, where the resection of the optic nerve had been made, that a year after he had to enucleate the eye because of the threatening symptoms of sympathetic ophthalmia, which, however, again declared itself very soon after enucleation. In the two reports, one by Clausen and one by Schweigger, the sympathetic symptoms manifested themselves in one case 17 days and in the other 12 days after the resection. In Clausen's case it occured in a patient aged 60 years, who had pierced the right eye with scissors in February 1876; he was examined for the first time the 3rd of July of that year. On the internal half of the cornea there was a cicatrice four millimeters in length to which the iris adhered. Total anterior synechia, the iris ballooned shaped, the globe slightly atrophied, no sensibility on pressure, no spontaneous pains. An iridectomy was made which soothed the irritation, which returned very acutely in April, 1885. Resection of the optic nerve was then performed. Ten days later the left eye had a very intense iridocyclitis.

About the end of the year these fresh symptoms all calmed by the influence of very energetic treatment, and without which some new intervention on the sympathetic eye would have had to be practiced. During this time it was totally atrophied. The visual acuity of the left eye is finally $\frac{8}{200}$.

In Schweigger's patient, aged 20 years, there existed an iridocyclitis in the right eye. The left eye is healthy with vision $\frac{5}{6}$. Resection of the optic nerve was performed on the right eye. The day after some slight pains are felt in the operated eye, but a violent hemicrania has disappeared. On examining the left eye twelve days later, a slight reduction of the visual acuity from one half to one third is found The visual field is normal, the edges of the papilla seem completely effaced: the head of the optic nerve and the adjoining retina have a clear gray tint, opaque, and slightly spotted or flaked; the retinal vessels greatly curved, are partly veiled by the haziness of the tissue which covers them. Near to the optic nerve there is a small hemorrhage.

Salicylate of soda is prescribed and after eight days there is marked improvement of vision. The haziness of the retina gradually disappears in four weeks. The sight gradually returns to $\frac{5}{6}$. Two years after there was no change noticed in the right eye. Resection of the optic nerve does not always give, as De Wecker says, a complete security to the patient. While it is performed to prevent the disease it has not, in very many cases, stopped the development of sympathetic ophthalmia. Schweigger, who, in 1885, had already made 100 resections, has twice seen sympathetic ophthalmia develop from twelve to fifteen days after the operation. Dr. Krones also relates a case where having made the resection of the optic nerve in a young man of 17 years, sympathetic symptoms developed and only disappeared after enucleation.

In the case which we described at the beginning of this paper the resection has been powerless to stay the evolution of the disease. After a passing improvement sympathetic ophthalmia began again and enucleation was absolutely necessary.

To what cause do we attribute this failure? To our thinking it results in the insufficiency of the operation. De Wecker regards the lymphatic sheath of the optic nerve as the sole channel of transmission of the infection. But may there not be some other channel of communication between the eyes. "If one reflects, says Scheffels, how many times these operations are accompanied by an effusion of blood in the orbit, one observes, at the end of some days, the bloody chemosis of the eye-lids, and of the conjunctiva, of the other eye, with sanguinary coloration at the base of the nose, one may be disposed to conclude that there also exists, in the anterior part of the orbit, lymphatic channels communicating with the other eye."

Gifford's experience also has already shown that in one case the transmission of symphathetic ophthalmia was caused, *not* by the lymphatic sheath of the optic nerve, but by a still undetermined canal conducting the disease in front of Tenon's capsule and from there into the cranium cavity. Other experiences, of Mazza, Randolph, etc , have shown also that the sheath of the optic nerve presents no trace of the passage of the infectious agent and that therefore there must be some other channel of transmission. In fact the sheath of the optic nerve being interrupted and not able to serve as a road for the infectious agent, it must be that it is carried by another channel, since the sympathetic symptoms continue to appear in the other eye. By the fact that the resection of the optic nerve does not suppress the channel of transmission it should be regarded as insufficient to stop sympathetic ophthalmia. When one compares resection with enucleation, one important point must be remembered, which is, that resection is a great deal more serious than enucleation. After the latter operation, should post-operative hemorrhage set in, there is very little danger if one drains the cavity as recommended by Prof. Panas or applies the primo-secundo suture as has been my custom: while after resection, if the blood accumulates behind the eye, it may push it forward and the pressure will be strong enough to cause spaculus (this symptom has not been reported as yet but should be taken into consideration). Meningitis has been said to be a possible complication after enucleation. Siffre, in 1889, said in his thesis he had met with it in 45 cases. He also points out that these cases were fatal, and that the surgeons of to-day were better prepared for these emergencies than formerly.

He does not say that meningitis follows every case of enucleation for, in many instances, there were signs of tumors of the brain which had shown themselves before the operation. The advocates of resection may certainly object here that no such symptoms have been observed after this operation, and that it is much less dangerous than enucleation. But such conclusions can only be temporary, for, though thousands of enucleations have been made, there have been comparatively very few resections reported. This will explain why so few serious inflammatory symptoms have been heard of. It is not impossible that such symptoms may be produced, as the traumatism of the operation creates at the back of the eye-ball a favorable ground for the development of inflammatory phenomena, as seen in Dr. Trousseau's paper. If one considers the mutilation to which the patient is exposed the advantage rests, in appearance, with the resection. One may thus sometimes preserve the form of the eye, its exterior aspect, and its movements, all of which is very considerable where one has to do with an eye in apparently a good state. Where the chances are equal there should be no hesitation between resection and enucleation, the latter not being so dangerous as the former. The comparison of the results of the two operations show us how superior enucleation is to resection. Resection has been performed but a very few times and already a great many unsuccessful results are reported.

In ten cases given by Marchal in his thesis, sympathetic symptoms declared themselves three times. Dr. Krones also gives a failure; Schweigger, who is the only one who has given a large number of cases, reports two failures in one hundred operations.

Compared with the thousand enucleations, the greater number of oculists emphatically declare the latter operation to be, by far, the better and safer. The ground of infection is removed and the disease therefore cannot be developed. In resection, however, the infectious ground is always present; the communicating channel certainly is suppressed but as that is not the only means the germs of the disease may show themselves at any moment.

In sympathetic symptoms transmitted by simple functional pains, photophobia, watering, and blephorospasm enucleation brings almost always complete cure. In one hundred and twenty-five cases of this class, collected by Marchal he reports one aggravation, three incomplete cures, two failures. In benign sympathetic inflammation the results given by enucleation, although less good than for sympathetic irritation, are favorable enough.

In ninety cases of irido-cyclitis or serous irido-choroiditis given by Vigaux, Rheindorf, Roland, Mooren and Reclus, Marchal notes but eleven failures or aggravations. Finally in cases of malign sympathetic inflammation when irido-choriditis is plastic, when abundant deposits are formed in the anterior chamber, failure is the rule· Sometimes however one meets with success.

Vignaux, in 16 cases of plastic iritis, reports six cures or improvements.

Andrew cites one case of malignant cyclitis cured by enucleation.

Rogmen relates two cures.

Steinheim has had a case of malignant iritis cured by enucleation. Reclus, a case of plastic irido-choroiditis, where enucleation brought about a notable improvement.

These few statistics show that enucleation has one great value for sympathetic ophthalmia, made preventively it opposes the development of the sympathetic symptoms.

As curative treatment it almost always cures sympathetic irritation; very often it stops the benign forms of ophthalmia, and although often impossible to contend against the malignant forms, one is always right to use it since, in many cases, success has been obtained. In a general manner enucleation is preferable to resection; it does not offer so many dangers, and as preventive and curative treatment it is far superior.

EXERCISE AND MUSCULAR DEVELOPMENT.

Written for the Ophthalmic Record by

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Before entering upon any general discussion of the training and development of muscles it cannot be inadvisable to consider for a moment what a muscle is and what it is capable of doing. "Indeed," says Edwin Checkley, "judging from the systems of training now so common, and the conduct of athletes in general, it seems questionable whether a knowledge of the muscles, their needs and applications is even as well diffused as many have supposed."

The material form of this "earthly house" is composed of innumerable molecules, and each seperate and individual molecule has its birth, life, and death and then its removal from "the place which knew it." Each molecule preserving its vitality for a limited space, is soon seperated from the tissue of which it has formed a part, resolved into its inorganic elements, to be in due course eliminated from the body by the organs of excretion. Muscle, that particular portion of tnis material form with which we are concerned, is formed of a mass of small fibres, made up of these molecules, running parallel with one another, and possessing a power of contraction, more or less great, according to their health and training. This power of contraction draws closer to each other the two ends of the muscle, and the parts to which the two ends are attached. Every such operation of the muscles involves the disintergration and death of a certain part of their substance. We cannot lift a finger, we cannot perform the slightest movement without causing a change in certain of the molecules which compose the muscles executing the movement; and this change involves their decay and death.

The loss then of the body, bring in relation to its activity, a second process is necessary to replace the loss, otherwise it would rapidly diminish in size and strength, and life itself would shortly cease. But the moment a muscle is summoned into activity the blood goes flowing through it with increased speed, bearing the pabulum for its re-creation; hence the importance of the circulation in any theory of muscular development. At every point in the human body is this law in unceasing operation, —activity, a loss of vital power, disintigration, decay and removal—to be met by a replacement of substance and a renewal of vital power. So, ever as the disintegration of any part is hastened by its activity, by a law equally unerring, is the flow of blood, bearing the renewing material, increased in that part; and the strength of the body as a whole, and of each part of the body individually is in ratio to the frequency with which these molecules are changed.

Since the relation of exercise to blood circulation is such as it is, the quality, quantity, and extent of such exercise, for the development of the functions of a muscle, are matters of prime importance. Should the exercise be continuous or intermittent? that is to say, should the muscular contraction be prolonged, or should there be a number of contractions of short duration? Should the resistance to the muscular contraction be slight; comfortably within its power, or should it be such as to tax its utmost capacity? These are questions constantly propounded to the practical gymnast. As to the first question, ceteris paribus, an organ will assume such forms and proportions as best fit it for the function required of it. This is founded on the essence of the law of natural adaptation. But nature, in her development of functional capacity never over-taxes an organ. Every step in the development of the human frame is progressive. When long strains are required, as in the muscles of the legs, nature adapts them to their use by graduated exercises. I have found no favorable results, in the making of muscle, from subjecting it to prolonged contraction. It in no wise promotes the removal of waste, nor does it so well aid in quickening the circulation nor in enlarging its area. It may toughen, it does not to the best advantage enlarge muscle. I submit the following statistics gathered from measurements made, during the past four years, with a view to determining the best method for developing muscle. The measurements in every case are the average of from four to twenty individuals. These experiments have been made as accurately as possible, upon college undergraduates where very little came in to augment the gymnasium exercise. I give average rather than individual measurement in order that errors may be reduced to a minimum. In some of the experiments light weights were used, in others heavy; in some the weight used was increased, the time remaining the same; in others the time was gradually increased, the weight remaining the same, and in others both time and weight were increased together. This last seems to me to be the natural and reasonable method of development and the following table, imperfect as it is, will bear out what is even more patent to the eye than to the tape line: —

	Weight Used. Pounds.	Rapidity. Flexions per minute.	Length of Exercise Minutes.	Time between measurements.	Gain inches
A	1	65	2	2½ months	.0
	3	50	2	2½ "	.1
	5	40	2	2½ "	.2
	8	25	5	3 "	.2
	11	15	5	6 "	.3
B	1	60	2 increased to 8	2½ "	.1
	3	45	2 " " 6	2½ "	.2
	4	50	1 " " 10	2½ "	.4
	5	35	2 " " 5	2½ "	.2
C	1 increased to 5	55	2	3 "	.1
	1 " " 6	50	5	2½ "	.5
	3 " " 6	40	2	2½ "	.2
D	1 " " 6	55	2 increased to 8	2½ "	.5
	5 " " 7	40	2 " " 5	2½ "	.4
	1 " " 6	50	1 " " 10	3 "	.6
	3 " " 6	45	2 " " 8	2½ "	.7
	3 " " 8	40	2 " " 8	2½ "	.8

NOTE. In group A, the gain was made before the expiration of the time recorded here, showing that the muscle had reached the required development for that particular function, and then it ceased. In B, C, and D there was a continuous gain.

Making use of the same methods in experimenting with both sets of muscles of the upper arm (the biceps and triceps together), with the muscles of the lower leg, fore-arm and neck, the same general results obtained:—that exercise taken with movements well within the muscular ability, not taxing the muscles so as to strain them, continued each time up to the point of fatigue, but, again, not so long as to wear the muscles out, increasing from day to day or week to week both the difficulty of the movement and the duration of the exercise, give the best results, both as to quantity of muscle and as to lifting power in the test of a dead pull: for *quantity* does not always mean quality.

It would seem to be almost axiomatic, that, if the muscular fibre is degenerated, "soft," or incapable of fulfilling its function, such a form of exercise will be best, which least destroys the muscular tissue, and at the same time most promotes the full circulation of the blood. For when exercise is properly conducted this waste and renewal go gradually and easily forward preserving complete health in the parts and steadily increasing the resources But when the exercise is unnecessarily violent the distruction of tissue is injuriously carried on: the process of repair cannot so nicely supplement the waste as in the case of reasonable exertion. And when exercise is introduced infrequently—after periods of almost complete inaction—it cannot atone for the sin of disuse.

As to the portion of the day best suited to exercise there can be no reasonable doubt that the morning hours afford the best results. Whether or not the exercise might be repeated more than once a day, with advantage, I cannot say from experience. I can say, however, that the above exercises taken once every other day effected an increase of less than two-fifths of that produced when the exercise was daily:—from which it might well be argued that a reasonably frequent repetition is best

In conclusion I would say that theoretically and empirically, I most thoroughly believe in exercises graduated in time and difficulty for the best development and health of muscles. Any exercise which over taxes the muscles by its difficulty, or by its duration, or by its rapidity, cease to be a system of training and becomes systematized *straining*. Far am I from condemning "heavy work" in athletics: light exercises and exercises that vigorously tax the strength, each have their place and value. The point is they should not be misplaced. Exercise, performed without moderation or rule, induces all forms and degrees of fatigue, and exposes the human machine to various injuries. On the other hand, muscular work performed in gradually increasing quantity and according to the rules of graduated training, brings about a progressive adaptation of the organs in the performance of more and more violent exercise.

A SIMPLE AND EFFECTIVE METHOD OF EVERTING THE LIDS AND REDIRECTING THE LASHES IN ENTROPION AND TRICHIASIS.

By GEO. H. PRICE, M.D.,

Assistant to Chair of Ophthalmology and Otology in the University of Nashville and Vanderbilt University,

Nashville, Tenn.

Each operator sees in the various operations which have been devised for the above conditions, some modification, slight though it may be, which to him seems best adapted to his own cases, giving good results in his own hands.

The operation, suggested and practiced by Burow, is in many respects the simplest of all those which have been instituted and in a certain number of cases, where the deformity is slight, results in relief more or less permanent, but in a large number it falls far short of the desired result. Upon this operation of Burow's, many of those now prominently before the profession are based, since its simplicity and incompleteness give ample room for improvement. The intermarginal operation of *Flarer* also, has served as a basis for modifications in various directions according to the fancy and ingenuity of the individual operator, while some aiming at orignality in every respect have devised methods unique, complex and at the same time somewhat difficult, resulting in limited use as a consequence In order to obviate these difficulties which come to all in practical experience, I present a method which, in my hands both in private and clinical cases, has given first class results. The procedure is about as follows: evert the lid and make an incision after the manner of Burow, extending a little beyond the point of turning in of the lid or lashes on either side, and if the deformity is marked, that is the lashes or margin of the lid strongly turned in, then make the cross incisions after the suggestion and practice of Savage, which enables you to place the lid easily in the position of ectropion. Fig. 1, shows the manner of making the Burow's incision combined with the Savage cross incisions, which latter incisions allow the shortened margin of the lid to be somewhat elongated. If the offending lashes are only a few and the margin of the lid but little involved in the trouble then the incision may be made as in Fig. 2, that is, brought out at an angle on the margin of the lid. After the incision has been made and all hemorrhage checked then the permanent outturning of the margin of the lid may be accomplished in the following manner:

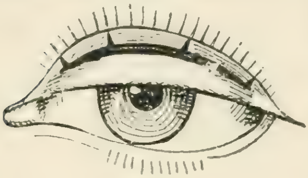

Fig. 1

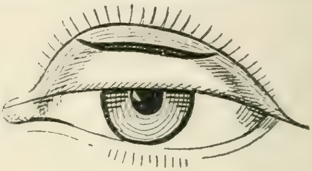

Fig. 2.

Take a narrow strip of surgeon's plaster (the best I find is the Johnson and Johnson Surgeon's Rubber adhesive plaster, ½″ wide), long enough to extend from canthus to canthus.

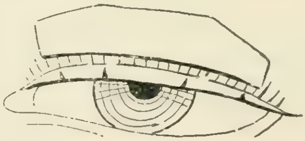

Fig. 3.

Now with the eye of the patient closed and all the hemorrhage checked and the lid dry in order that the plaster may adhere, you make gentle traction upon the skin of the lid thus causing the lashes and margin of the lid to become ectropic, then apply the edge of the strip close down to the roots of the lashes next to the muco-cutaneous margin, being careful to include all the lashes in the grasp of the adhesive surface of the plaster. This being accomplished relax the tension on the lid and allow the skin to roll down, after which bring the free upper edge of the plaster high up on the skin of the lid until its margin is well everted, holding it firmly but gently in this position until it adheres, as shown in Fig. 3. Thus you have redirected tenporarily all the lashes and everted the lid margin at the same time.

This will prevent the free movement of the lid to a certain extent, but it will cause a wide gaping of the incisions on the conjunctival surface which soon fill in with organized material that prevents the margin of the lid from resuming its former abnormal position; it also serves to re-direct the lashes as a whole from the globe, a point of some importance. This plaster, if properly adjusted, will remain for several days. I have had the same plaster to remain for 4 to 5 days, by which time the lid is well fixed in its new position. If, however, for any reason you find it expedient to remove the plaster it can be easily done and another strip applied.

In removing the plaster, the lashes will be found adhering to the skin of the lid; it will be well to leave them, not attempting to remove any hardened secretion which may be found sticking to them. If any lashes have escaped the first application they can now be brought up and out of the way along with the rest.

Your patient complains but little and you can use such antiseptic washes as you may see fit.

The reaction after this method is much less than is usually found in those cases where any form of stitch has been used and for this reason Dr. Savage and myself have abandoned his double stitches, a most effective method of operating, except in those cases where there are no lashes, using the plaster instead.

This method may also be used after Flarer's intermarginal incision with good results.

The features of this method are, simplicity, slight after-reaction, freedom from irritation due to any form of stitch, ease with which the plaster can be removed and re-applied daily if necessary to increase or diminish the effect, re-direction of all the lashes as well as the margin of the lid throughout its entire length, with equal tension upon all points of the margin.

REPORT OF A CASE OF SNEEZING DUE TO AN UNCORRECTED ERROR OF REFRACTION,*

By J. T. HERRON, M.D.,

Jackson, Tenn.

I was called Sept. 9, 1890, to see Mrs. B. age 28. I found her suffering with one of the many attacks of sneezing, which she had had for a week previous. She was almost exhausted. She would sneeze for several hours, until forced to lie down, and by so doing, would be relieved. Upon rising and resuming her household duties, the attack would return. This had kept up almost day and night for a week before I was called. I examined her nose, both anterior and post nasal. The mucous membrane was slightly injected from prolonged sneezing. There were no hypertrophied growths. The breathing was free through both sides. There were no symptoms of catarrh. Her throat was normal, with exception of tickling sensation in roof of mouth, previous to an attack, which would disappear immediately after. She had never had any throat trouble.

A brief history of her case states that, about four years ago, she had her first attack of sneezing, which lasted all night. The family thought she was taking a deep cold, but found after the attack ceased she was entirely free from cold, and felt quite well. The interior of her nose would burn like fire, and appear very dry when sneezing came on, but would disappear at once when attack ceased. These symptoms have been present with each attack. As I found no cause for these attacks by examination of her nose and throat, I asked what she was doing when the attack appeared, and I found she was either reading or doing fine needle work. She could not read but a few minutes, before her eyes would feel tired, and the letters would appear to run together.

* Read before the West Tennessee Medical and Surgical Association, in Jackson, October, 1892.

I felt sure these attacks originated from eye strain, there being some form of defective sight.

I did not prescribe for her nose, but advised her to be tested and fitted with glasses.

These attacks of sneezing lasted five days longer, making 12 days in all. Will state that she had had attacks every few weeks for four years, but not so long as this one.

One week after my visit she came to my office.

O. D. and O. S. V. $= \frac{20}{20}$ before dilation of pupils.

O. D. and O. S. V. $= \frac{6}{100}$ after dilation.

O. D. V. $= \frac{20}{15}$ with $+ 2.50$.

O. S. V. $= \frac{20}{15}$ with $+ 2\ 50 \bigcirc + 0.50$ cyl. ax. 180°.

I ordered for constant use :

O. D. $+ 1.50$.

O. S. $+ 1.50 \bigcirc + 0.50$ cyl. ax. 180°.

A few weeks since I called to see her, and she stated that she had since had but two attacks, and both of these were brought on by not using her glasses. The first occurred 12 months ago. The second recently, after sewing sometime without her glasses.

None of her family except mother has ever had attacks of sneezing. She wore glasses most of her life. She died at the age of 59. Her attacks seemed to come on as her daughter's, but would last only a few minutes. I believe if she had been properly fitted, her attacks would have been relieved. I am sure if she had astigmatism, it was not corrected, as she was not fitted by an oculist. It might be that her hypermetropia was partially corrected, which caused the light attacks of sneezing.

Will say, in conclusion, this is the first case I have ever seen of this nature. Dr. Gould, of Philadelphia, reported a case a few months ago of "taking cold," which was cured by refraction. His patient would begin to take cold as soon as he left off his glasses

This patient of mine sneezed without taking cold, in fact she is quite well after the attacks.

She is thoroughly convinced that her sneezing is due to her eyes.

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NO. 1 VOL. I TO BE REPRODUCED.

A sufficient number of requests for the reproduction of No. 1 Vol. 1 having been received the work will be accomplished before the appearance of No. 8 of the current volume. In medical journalism the reproduction of an exhausted issue is by no means common. In any case it must show a high degree of prosperity of the publication. The *Record*, not wanting in friends in the beginning, is gaining in this direction daily. This is due, to a great extent, to the fact that old friends, beliving that the *Record* "has come to stay", speak confidently about it.

◆

DR. FISHER

Who practiced ophthalmology several years in Fort Worth, Texas, has removed to this city.

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DR. HOTZ' REPORT

Of a case of so-called Hemorrhagic Glaucoma, appearing in No. 6 of this volume of the *Record*, was, by accident, not indexed. We have already begged the pardon of the author, and now take pleasure in directing the attention of the reader to the paper on page 234.

BLACKISTON'S VISITING LIST

For 1893 is out and presents the usual neat and convenient arrangement for recording the daily work of the practitioner. It also contains some valuable information, such as the doses of medicines, given in both the English and Metric systems: descriptive list of new remedies; a table of poisons and antidotes, etc. It can be had of Blackiston, Son & Co., Philadelphia, for $1.00.

THE NEW VOLUME

Of proceedings of the Section of Ophthalmology of the American Medical Association has made its appearance. It shows that the Detroit meeting, last June, was a very good one. The 32 papers published, occupying 355 pages are all in good English, and most of them contain thoughts that are worthy of consideration. The discussions appear to have been correctly reported and are published in connection with the proper papers. Exceedingly few errors mar the present volume. It is not only neatly printed but is well bound. It should be in the library of every ophthalmic surgeon who wishes to keep up with the thoughts of his *confreres.*

We would offer only this criticism: papers should be a little better classified in future volumes, and the title of the paper and the name of the author should be properly placed at the top of the pages.

LA REVISTA MEDICO–QUIRURGICA.

The above named journal, which includes every department of medicine, has been started in New York. It is intended for circulation in those countries where the Spanish language is read and spoken, and in those countries will no doubt meet with a hearty reception on the part of those engaged in the healing art.

If every one whose name appears as a collaborator *labors* the new journal is bound to be a success, from a literary stand-point. The department of Ophthalmology is under the supervision of Drs. David Webster and J. E Weeks, of New York City. The Editors are Drs. Samuel E. Milliken and Pedro J. Salicrup.

MUSCLE DEVELOPMENT

Is the subject of Prof. Huntingdon's paper, in this issue. At our request he prepared this paper as a prelude to our study of the development of the ocular muscles by prismatic and other exercise, which we hope to begin in an early issue of the *Record.* Prof. Huntingdon's paper is clear and impressive and will be read with interest. What he shows us to be true of the muscles experimented on, must be true of all muscles under like conditions. But few oculists have given that patient and pains-taking study to the development of the ocular muscles that its importance demands. One or more of the *few* will be expected to speak through the *Record* soon. There should be established rules for our guidance in developing muscular harmony. There are cases in which this harmony can be established only by weakening the strong muscle by operation; on the other hand there must be cases in which it would be better to make the weak muscle strong by exercise. How and when to resort to the ocular gymnasium are questions that must be answered. Any one having had experience in this study should communicate the results of his observation through the *Record.*

ADDITIONS TO LANDOLT'S PAPER ON CATARACT OPERATION.

On page 163, October–November issue, of the *Record*, 12th line we read: "If I make a large incision, as is required in cataract extraction, I also make a larger excision of the iris." Later Landolt says: "In this connection I may be permitted to mention the form of lance which I have used, advantageously,

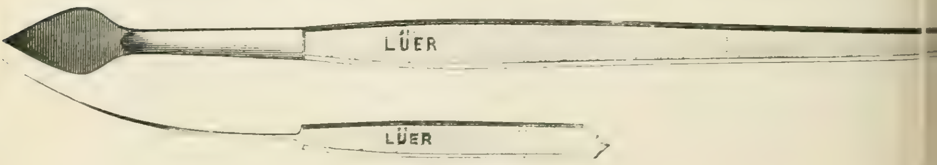

FIG. 1.

for years. As fig. 1 shows, the axis of the instrument is not angularly inclined, but the easy curve of the neck of the instrument continues the same to the very tip of the cutting part. In this way it is possible to always direct the instrument along its own axis, from which fact results a considerable gain in both power and accuracy."

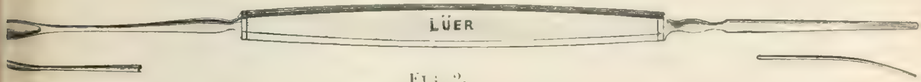

Fig. 2.

Fig. 2 is here published to show the instrument referred to on page 171, same issue of the *Record*, where Landolt says: "At the same time that we are very prudent concerning the introduction of instruments into the eye, after the issue of the lens, we have often, however, recourse to a little curette, which we have had constructed *ad hoc*, and which has rendered us the greatest service, without having ever acted prejudicially upon the eye which has undergone the operation. It is a very fine curette, flat enough to pass easily under the iris, sufficiently excavated, however, to gather the soft parts and bring them out of the eye. Thanks to its form and to its rounded borders, the curette serves likewise in the reposition and spreading out of the iris. The instrument bears, at its other extremity, a flat surface, which is very useful in the *toilet* of the iris and of the wound. Both curette and spatula are of silver, hence easy to render aseptic. Moreover, nothing hinders their being made of gold, whose contact, according to Waldhauer, is still milder; or of platinum-iridium, as is recommended by Gruening, because this metal endures being brought to a white heat, without deteriorating in consequence." *

Landolt wishes also to say that he did an injustice to Fuchs in saying that his little dressing-mask was devised by Prout.

Again he wishes to quote Priestly Smith further, as follows: "From the very beginning of my practice, until now, I almost always have made a preliminary iridectomy." He wishes also to quote Ramsey, of Glasgow, as follows:—"I always prefer to operate with a preliminary iridectomy, although sometimes I am obliged to perform the combined operation."

* Transactions of the Medical Society of the State of New York, 1891, page 354.—GRUENING.

A NOVEL PROCEDURE.

We recently spent two days very pleasantly in Louisville. While there we saw an operative feat performed, which, if we had ever thought of it at all, we thought impossible. In mentioning the mode of operation it is not our intention to encourage any one to undertake it. The operator was Dr. Dudley S. Reynolds; the operation was cataract extraction, and the cataract was in the left eye. The operator is not ambi dextrous, yet he stood at the head of this patient and, with a Beer knife in his right hand and without the aid of fixation forceps, made a beautiful corneal incision through which instantly the lens escapeded (he did the capsulitomy with the point of the knife before making his counter puncture) without that manipulation which is usually necessary for its delivery. The Doctor told us that he always made the corneal incision in the left eye, in extraction cases, with the handle of the knife over the bridge of the nose. This mode of operating must be *peculiar* to Dr. R. and, it is to be supposed, will remain so.

In this connection it may be stated that friend Reynolds operates on his cataract patients in his office, and sends them in a carriage to their homes, the hospital or a boarding house. Sometimes he allows them to walk away with an attendant. He believes an iridectomy never indicated, and, therefore no longer performs it, in his extraction cases.

Reynolds, Merrell and Alt constitute an American trio who allow their cataract patients the *greatest* liberty. The far greater portion of American oculists are not so *advanced* on the liberty line.

G. E. deSCHWEINITZ, M.D ,

Has been elected Clinical Professor of Ophthalmology in the Jefferson Medical College. While he is worthy of such a position in that or any other Medical School, his election has not met the approval of a large number of Jefferson Alumni, and for the reasons : 1st, that he is an Alumnus of the Medical Department of the University of Penn.: 2nd, no opportunity was given Jefferson graduates to become candidates for the place. For a long time Jefferson Alumni have felt that their Alma Mater was not doing the right thing by them in taking into the faculty so many who are graduates of the University, a rival institution, so that now about half the teaching force are University men. What action the Alumni will take, on Jan'y. 10th, cannot now be known It will be good for the college if only a protest be made against such action in the future. It is to be hoped that wise counsel will prevail in the meeting of the Alumni and in future meetings of the Faculty and Board of Trustees.

Prof de Schweinitz still holds his chair in the Philadelphia Polyclinic, but has resigned his lectureship in the University of Penn. Prof. Wm. Thomson is still honorary Professor of Ophthalmology in the Jefferson, a position which he has held for more than twenty years.

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DR. JUAN SANTES FERNANDEZ, OF HAVANA, SAYS:

"The cases in which I employed europhen may be divided into conjunctival inflammations, keratitis and accidental traumatisms and operation wounds.

"Case 1. J. W., mulatto, aged 62, afflicted with subacute glaucoma and cataract, had iridectomy performed on Sept. 12, 1891. Since the day following the operation was treated with europhen ointment 0.10 : 10, vaseline. The marked injection of the conjunctiva began to subside on the third day, and the wound of the cornea closed after eight days without any inflammatory reaction.

"Case 2. S. P., negro, admitted to the clinic Sept. 16, 1891. Eight days previously had got a drop of quick lime into his eye, which was followed by a burning sensation and severe pains, so that he was incapacitated from work From the day of admission europhen ointment was applied and the better to observe its effect the eye was not washed with antiseptics and no other medication was employed. The inflammatory injection of the conjunctiva was already diminished on the first day and the superficial ulcer presented a healthier appearance and is now cicatrizing.

"Case 3. J. A., mulatto, aged 28, entered the clinic May 12, 1891, after having suffered for six months from trouble with both eyes. The diagnosis was kerato-conjunctivitis. Patient presented a marked scrofulous habitus. On my return from Europe, Dr Ma lan told me that he had employed antiseptic washes of boracic acid and sublimate, salol ointment and inunctions of petrolol, without obtaining any appreciable improvement, notwithstanding that these measures were combined with general treatment. Europhen ointment was then employed and considerable improvement was already manifest after fourteen days.

"Case 4. A. P., negro, aged twenty, suffering frem keratitis marginalis of the left eye. After application of europhen ointment rapid healing occurred.

"Case 5. R. C., underwent an operation for an artificial pupil on September 15, 1891. On the following day europhen was applied which was well borne, and the keratotomy wound healed rapidly.

"Case 6. L. M., aged 40. Partial extirpation of a tumor connected with the eyeball. Notwithstanding strict antiseptic precautions the anterior segment of the wound failed to cicatrize. Eight days after the operation we commenced the use of europhen ointment. After the first application the suppuration at the site of operation ceased although lotions of boric acid and sublimate had been employed daily without success."

* * *

PHENACETINE.

"In ordinary colds, one or two 3 grain pills of Phenacetine remove all symptoms. The combination of salol (or Salophen) with Phenacetine is especially useful in influenza and rheumatism.

"The analgesic effects of Phenacetine are very marked in various forms of headache, including migraine and the headaches from eye-strain, having the advantage over antipyrine in not so frequently causing a rash."

Department of Otology, Laryngology and Rhinology.

GEO. H. PRICE, M. D., EDITOR, 621½ Church Street,
NASHVILLE, TENN.

THIS issue of the *Record* brings us into a New Year, which we hope will prove as successful to the interests of this department as that just closed The *Record* as a whole and this department specially, owes much to its friends, who have with such generosity contributed to its pages in the recent past, to whom it now extends many thanks. As the ultimate success of the *Record* must depend in a large measure, if not entirely upon its friends, we trust that with the coming year each subscriber will feel free to write on such subjects and report such cases as will be of interest to his professional brethren. It is our aim to keep in touch with the general advance along these special lines, and we will be glad to record those experiences which add to our stock of information.

INTERNATIONAL CONGRESS OF OTOLOGY.

We have before us a circular letter from eminent gentlemen of the profession specially interested in otology, and living in Rome, Milan, Venice, Genoa and other cities of Italy, requesting that those interested in the General and International Congress of Otology, which was appointed to meet in Florence, to signify their willingness for this Congress to meet in Rome at the same time as the Universal Medical Congress, which holds its XIth meeting in September, 1893. To this request we can see no possible objection, as the occasion will be one of unusual interest to all branches of the profession, while at the same time there is every assurance that this change would add to the interest and pleasure of the meeting. Special effort will be made by the representatives of this department of special medicine, to make all who are in attendance feel that they are welcome in the Eternal City. It is desired, that all those interested in this important meeting, should signify their approval or disapproval of this change, by writing to DR. GHERARDO FERREVI—, via Cavour 71,— Rome, Italy.

EXTRACT OF DR. RANDALL'S PAPER

Read at Detroit, June 1892.

MASTOID TREPHINING, WITH THIRTY-TWO CASES OPERATED ON AMONG SOME 3400 NEW EAR PATIENTS OF 1889 TO 1891.

Dr. Randall (Philadelphia) called attention to the growing tendency to operative treatment in Otology, as in other fields of practice, and to the increased necessity for intervention, especially for mastoid empyæma or caries, since the epidemic of influenza. Even those disinclined to intervene thus are likely to find, as he had done, that the need was increasingly forced upon them. Among some 3400 new patients of this last triennium of work, there had been upwards of 100 mastoid inflammations; and while many were brought to resolution, there were 32 operations upon the bone, as well as others where operation was refused or could be carried out from the canal. Pus was present in every one of these cases, and in only one was the exterior of the mastoid intact. This last was one of the two cases that terminated fatally, and the only one in which the operation could have contributed to the fatal issue.

He concludes that operation is not always necessary, unless pus is present; that pus should always be evacuated, and it should be sought within the bone in all suspicious cases. Ether is generally needed in order to permit of thorough exploration, as it is impossible to determine in advance the exact condition to be found.

All diseased tissue possible should be removed at once, and the minimum of dressing or irrigation left for the after treatment.

CHANCROID OF RIGHT EXTERNAL AUDITORY MEATUS AND AURICLE, FOLLOWED BY ERYSIPELAS OF FACE AND SCALP.

By R. C. HODGES, M.D.,

Galveston, Texas.

E T. age 30, Mulatto, consulted me in January last about a discharge from right ear. One week before had noticed slight watery discharge from ear with considerable pain. Had been syringing without any effect. On examination, I found on anterior wall, just at the insertion of cartilage, a large, ugly, solughing ulcer; very painful and discharging ichorous pus. With the exception of considerable swelling, other parts were normal. This location being quite a frequent one with syphylitic eruptions, I questioned him carefully as to history of specific disease. He admitted being afflicted at the present time with gonorrhœa, but careful examination failed to discover chancroid or other ulcer of the genitals. I told him of my suspicions as to the nature of the sore, gave him peroxide hydrogen as a wash and applied aristol locally. I cautioned him to be very careful in dressing the ear not to scratch or irritate the skin. I was tempted to test by inoculation the nature of the lesion, but was spared the trouble, as in a few days a fine large chancroid appeared in upper and outer portion of concha, which point he had scratched with his finger nail. This second ulcer rapidly assumed a phagedenic character, sloughing so as to expose cartilage and producing swelling to such an extent that the deformity would have been laughable but for its serious nature. The cervical glands became enlarged, the face and scalp swollen, brawny and painful, the eyes closed and the nose and lips enormously exaggerated in size. I continued the local treatment and turned him over to his family physician who successfully combated the other conditions. Three weeks later he came to my office. There was still considerable swelling of face, the scalp bald in spots and an exfoliation of the epidermis of face and scalp in progress. At present time his codition is normal.

EARLY DIAGNOSIS OF MASTOID DISEASE AND OPERATION, AS A LIFE SAVING MEASURE, IN THE PREVENTION OF PYÆMIC AND MENINGITIC COMPLICATION.

Abstract of paper read before the Section of Laryngology and Otology of the American Medical Association, Detroit, Mich., June, 1892.

By D. MILTON GREENE, M. D.,

Grand Rapids, Mich.

Dr. Greene calls attention to the fact that, while acute suppurations of the middle ear are common and many uncomplicated, yet other cases develop features which render them most serious in character. The extending of this suppurative process to the mastoid cells, thus inducing pyæmia, cerebral abscess or meningitis, are the points to which he calls special attention, as possibilities in these cases.

"In looking over the literature on the subject of mastoid disease, I find no other guide to a diagnosis of pus in the cells, than the external signs and symptoms of pain, redness, swelling and œdema over mastoid, which must be present to justify an operation; notwithstanding the report of a few cases in which perforation, pyæmia and death followed acute suppuration in the middle ear, without the external signs and symptoms over mastoid."

From these facts he concludes that while these symptoms are not essentially signs of pus in the mastoid cells they do co-exist in some cases. Again he thinks, that while the inflammation in the mastoid periostium may be due to extension of the process from the antrum through the bone, yet it is more reasonable to explain this by an extension of the inflammation direct from the middle ear, along the periostium to the mastoid. This being the probable method of extension in those cases with a marked external expression of the disease, while in others there is no external sign, yet. the mastoid cells may be seriously involved.

"I believe in all cases of acute suppurative otitis media, where pus is discharged from the ear in any considerable quantity, after the drum head is freely open and the ear has been thoroughly cleansed by irrigation with a hot boracic acid solution every two hours, and Politzerization for two or three days, it must come from an abscess cavity and could not be secreted by the lining of the tympanum; that when together with offensive discharge there is swelling of the upper and back part of the tympanum, there is pus in the mastoid cells especially when attended with rise of temperature and pain in the occipital region. When vertigo, relentless pain in side of head, or a sense of fullness is present, it strengthens the diagnosis of cell complication, and we are justified in exposing the cells whether external signs and symptoms over mastoid are present or not."

In the cases detailed, being five in number, he has excluded all those where "pain, tenderness, swelling and œdema or any one of them, were present."

Of these five cases, four were operated on and in each the diagnosis was verified, the cells of mastoid in each being involved, and patients made good recoveries in about five weeks. In the fifth case operation was advised but refused, this patient lingered fifty-one days, then died from metastatic abscess following pyæmia. "Autopsy revealed perforation into lateral sinus and a clot three-fourths an inch long lying back of petrons portion."

In all these cases the treatment had been thorough, both local and constitutional.

THE FOLLOWING ARE THE CONCLUSIONS REACHED BY THE AUTHOR FROM A STUDY OF THESE AND OTHER CASES:

1. That in acute suppurative otitis media, with the drum head freely open—if, after two or three days' treatment by thorough irrigation with hot boracic acid solution every two hours, and the tube and tympanum cleared by Politzerization, pus continues to flow so that the canal is filled in an hour or two, or saturates

a plug of absorbent cotton and attended with rise of temperature and chills without other assignable cause, with swelling and bulging of membrane in upper and back of tympanum, with no swelling from above pointing downward, and no swelling below pointing upward, there is pus in the mastoid cells, and an operation is indicated and justifiable for the safety of the patient. For, as Sir William Wild said a half century ago, "when after the first gush of pus following opening the drum membrane, it continues to flow in any considerable quantity, it must come from a pus cavity, and could not be secreted in the tympanum." (When the above mentioned signs and symptoms were present, I found pus in the cells when opened.)

2. That there is no more reason for delaying mastoid operations, when pus evidently exists in the cells, than for the surgeon to delay operation in suppurative appendicitis, or the gynecologist in pelvic abscess.

3, That the operation of opening a mastoid abscess is not more dangerous to life than opening other abscesses.

4. That if no pus is found in mastoid, it heals quickly and no harm results, but if there is pus or extreme congestion, the operation does good and may save life.

5. That the probability of death from opening healthy mastoid cells is not as great as the probability of pus existing in the cells in cases of acute suppurative otitis media, where the signs and symptoms already mentioned exist.

6. If pus exists in the cells it is a sound surgical principle that it should be removed before it has caused disease of contiguous structures.

7. That when death occurs after mastoid operations, it is from the disease for which the operation was done and not due to the operation.

8. That suppuration in the cells with early suppurative mastoid periostitis, is not as dangerous to life as where the latter does not exist, for such concomitant tends to soften the dense external bone and favors spontaneous external perforation.

9. That when swelling and tenderness in the auditory canal is extreme, so that an examination of the middle ear is difficult or impossible, it should be done under an anæsthetic.

10. That in acute suppurative otitis media, a rise of temperature to 104° or 105,° with chills or rigors, does not contra-indicate opening the cells.

11. That chisels are the best instruments with which to open the mastoid, commencing at the tip of the process, and cutting upward and forward.

PERFORATION OF THE LATERAL SINUS.

While using Hamilton's bur-drill in opening the mastoid cells, at a point about a half inch back of, and on a level with, the external auditory canal, I opened into the lateral sinus at a depth of about one eighth of an inch. There was a gush of blood which I stopped by placing a finger over the drill hole; until I could secure a strip of bichloride gauze, this was packed firmly into the drill hole, and a compress and bandage applied and left undisturbed for two days.

I then removed dressings and no hemorrhage occured. As no pus had been reached in the first operation, I packed the drill hole with equal parts of boracic acid and iodoform, and again proceeded to open the cells with a hollow chisel, commencing at point of mastoid. cutting upward and forward. keeping close to auditory canal. I reached the cells at a depth of one-half inch, and found pus, which continued to flow freely from the wound for three weeks. In dressing the wound I always took the precaution to wash the pus out of wound with a 1 to 40 carbolic solution without disturbing the packing in drill-hole I then replaced it with fresh powder. No bad effect followed the accident of opening the sinus, and patient made an uninterrupted recovery.

THE REGULAR MEETING OF THE SECTION ON LARYNGOLOGY AND RHINOLOGY HELD AT THE NEW YORK ACADEMY OF MEDICINE, ON WEDNESDAY, MARCH 23, 1892.

DR. CHAS. H. KNIGHT, IN THE CHAIR.

Dr. C. A. Powers presented an oral speculum devised during the past year by Collin the Parisian instrument maker. It consists of a framework supporting four "jogs" which fit the posterior molar teeth.

These four "jogs," as they may be called, catch the molar teeth above and below on either side, and if the screws are then turned they separate the jaws of the instrument to any desired extent.

The tongue depressor in this instrument, is rather faulty, because it does not depress the tongue quite enough. It should be movable and in another instrument I would have it so made.

This instrument has the advantage of interfering to the least possible extent with the hands of the operator and it is especially useful in working on the roof of the mouth.

It possesses an advantage over the Whitehead instrument in that the space is exceptionally free.

The catches for the teeth are adjustable and can be separated to any desired extent, and can be adapted to the small mouth of a child or the large mouth of an adult.

Dr. Powers also presented the following case:—The patient, a man twenty-five years of age, fourteen years ago while in Italy, had a small tumor removed from the upper jaw which from his own description was an epulis.

Four or five months ago he came here with a large growth springing from between the incisor teeth of the upper jaw spread out over quite an area, perhaps as large as the last phalanx of the middle finger.

A small piece was removed, microscopic examination proved it to be an epithelioma.

In the hospital Dr. Weir removed the anterior portion of both upper jaws.

This case illustrates the fact that malignant growths may be met with in patients of this age. In the past year I have seen several malignant growths in patients under thirty years.

Dr Powers then presented a case of *partial laryngectomy.* The patient was a man fifty-four years of age, who was in excellent health until June last at which time he began to be troubled with hoarseness, which did not yield to ordinary remedies. He was sent to New York and here consulted Dr. G A Richards who found the growth in the right side of the larynx. At that time it was about as large as an almond.

He was put upon Potassiumn Iodide in fairly large doses, but bore it badly and as the laryngeal difficulty did not improve, it was thought to be of a malignant character. This idea was concurred in by Drs. Delavan and Lefferts, and he was placed in my hands for excision of the growth.

On the twelfth day after a low, preliminary tracheotomy he was chloroformed, and the larynx opened in the middle line; a rubber ball was placed in the trachea to prevent the passage of blood to the lungs.

The right half of the larynx was found to be the seat of a diffuse growth encroaching upon the front half of the left side. The right half of the larynx together with the anterior portion of the left side was excised with a sweep of the adjacent tissues.

The anterior wall of the œsophagus was excised down to about the level of the middle of the thyroid cartilage.

The trachea was plugged above the tube and the wound stuffed with iodoform gauze; the patient made a good recovery.

He is now wearing an artificial larynx. It is a modification of the Gussenbauer larynx: the inner tube passing into the trachea and the upper going up into the pharynx.

When he eats, he puts in the pharyngeal plug which closes the upper end of the upper tube, and the food passes directly over it.

In speaking he inserts a reed, with the use of which he can make intelligible sounds.

Dr. Beverly Robinson asked Dr. Powers if it were necessary for the patient to wear the instrument continually. Dr. Powers replied, that if left out too long the granulations would close down pretty quickly and make the holes too small for the tubes.

TREATMENT OF TONSILAR HYPERTROPHY.

By Jonathan Wright, M. D.,

Brooklyn, N. Y.

The main idea aimed at in the paper, is the best method of treating this condition, with reference to the prevention of hemorrhage.

The statistics as shown by Dr. Wright are not reliable on this point, and further he considered that each case must be treated or managed according to the conditions presented at the time.

He advises the use of the guillotine in all cases of children, as experience approves this as entirely safe and expeditious, however when the patient has reached the age of 18 years or over, then the question of hemorrhage is an important factor in deciding the method of operating, "It is impossible to tell by feeling or by inspection in an adult case what the vascular condition of the tonsil is at the plane through which the incision is to pass."

This being the case he does not depend on the surface appearance or the sense of touch to guide him in the operation.

The galvano-cautery tonsillotome, is advised in all those cases where adjustment of the loop is easy and the galvano-cauterization or ignipuncture for those cases in which the loop cannot be used.

He can not understand how some of his brethren give thirty to fifty sittings to reduce large tonsils by ignipuncture, saying that he gives seven to ten and in some rare cases as many as fifteen sittings.

Touching the question of separating the tonsil from the anterior pillar, he said, he had not been able to do this, nor had he seen any one else accomplish it.

In regard to the use of a general anæsthetic he favors this only when you have to choose between two struggles. He uses ether when it is necessary. There is greater liability to hemorrhage when ether is used.

When necessary to remove also lymphoid tissue from the vault of the pharynx, the doctor thinks it preferable to remove the tonsils, then wait several weeks before operating on the lymphoid tissue.

The discussion upon Dr. Wright's paper was opened by the chairman, Dr. Knight, who said ; I feel disposed to take issue with Dr. Wright's condemnation of the use of ether in tonsillotomy. We should not smother the patient with ether, but should give it in a proper manner and in a proper quantity. We do not press it to the point of abolishing the reflexes. Thus we avoid the danger of blood and debris entering the larynx, and the contractility of the faucial muscles being preserved, the tonsil is forced into the fenestra of the instrument by the act of gagging and a thorough excision is ensured, precisely as though ether were not given.

After all, from my standpoint, the special reason for using anæsthesia is to permit a more thorough exploration of the pharynx. It is not an agreeable process to examine the pharynx of a child with the forefinger, and a rhinoscopic examination is a very difficult matter in a child under 10 years of age. The main object in giving ether is therefore to allow more careful and deliberate investigation, and if necessary I clear out the rhino-pharynx and remove the tonsils at the same sitting.

Dr. Robert Myles said : I would place myself with those in favor of removing all diseased tonsils ; but the best method of removing them has been to me a great problem. For a time I used the guillotine almost exclusively, until I operated upon a young man between 25 and 30 years of age who came very near bleeding to death, and who remained anæmic from the effects of the bleeding for a long time afterwards. Two or three weeks after the occurrence, I had occasion to examine one of my colleagues, and I advised that he should have his tonsils removed. He had it done a few weeks later by another, and he also came very near losing his life from hemorrhage. This all happened within a few weeks, and since then with all patietns over 18 years of age with hard or suspicious tonsils I use electricity. I tried the cold wire snare but in cutting through the base of the tissue some of the crypts were pulled out and cut irregularly. It caused a great deal of inflammation and increased the suffering. Then I tried the electric wire. The difficulty with the wire is that it also created a disturbance, especially in the anterior pillar. If I used a large wire the heat was so great that the stump was very sore for a week or two. I tried small electrodes, and cut the tonsils in different sections, then used a small wire snare No. 28, and cowhorn vulsellum forceps to remove sections separately, and I have found the result better than with anything used yet. In all cases I used cocaine; and pushed it well in between the pillars and into the crypts of the tonsils with a crooked probe, so that it would relieve all pain during the act of engaging. The canulas which I have seen in our stores are made so that a short circuit may take place, and hence the wire refuses to cut entirely through. I am trying to have a canula constructed which will be free from this objection.

If you use a very small wire it will bend; if you use a heavy wire it gives too much heat and usually creates excessive inflammation from radiation of heat. The larger and the more pedunculated the tonsil is, the easier it is to take it off, but usually a tonsil with a broad base and not protruding requires several operations to remove it properly. It is reported that hemorrhage may take place from this operation, but I have never had any. I did have a case of unimportant bleeding once where the coagulum was pulled off with a large cooling electrode, but never with the small knife or wire.

Dr. William K. Simpson, said: the subject of hemorrhage after tonsillotomy, is one of the questions under discussion. It must be well taken into consideration, that no operation in the whole domain of surgery, however slight, is without its possible danger, but this possible danger should not deter us from operating when it is necessary to do so. Tonsillotomy forms no exception to the rule. According to the statistics of the paper just read, the danger is reduced to a minimum. There are some cases of severe hemorrhage but they are very rare indeed and only in adults, there are only two recorded deaths. I think in children, the danger from hemorrhage is entirely out of the question. We must be guided in our opinion, somewhat, by our individual experience. I have operated a great many times and have never seen anything approaching a dangerous hemorrhage. Of course we do not always hear what happens after the patient leaves us, and we may sometimes credit ourselves with results to which we are not entitled.

When we take into consideration the great benefit derived from tonsillotomy in children, the operation is at once deprived of the stigma of butchery. I know of no operation, the results of which are more satisfactory, than tonsillotomy in children. Liability to hemorrhage, both in children and adults may be avoided by studying the individual case.

Dr. C. A. Bucklin, said: my father performed the operation of tonsillotomy for over forty years and during that time met with no severe hemorrhage. I had been practising only one year when I had a patient, a young man 19 years of age who nearly bled to death. Notwithstanding, that constant digital pressure was maintained on the bleeding surface for four hours, the prostration resulting from the loss of blood was alarming. I have performed the operation for 16 years since and have never met with another alarming hemorrhage. The danger from hemorrhage is so remote that I make it a universal practice in uncomplicated cases of removing both tonsils simultaneously with an instrument in each hand. When vascular anomalies exist, alarming hemorrhage may occur even if galvano-cautery is used. I prefer the cold wire snare in such cases and believe that hemorrhage can be more surely avoided by its use than by the use of the galvano cautery snare. The choice between these two methods of avoiding hemorrhage is an open question and each operator is justified in selecting the means he prefers.

Dr. Wendell C. Phillips said: "I do not like to see this discussion closed without taking issue with some point in Dr. Wright's paper.

The first is that in relation to the separation of the anterior pillars of the tonsils. In many cases with a proper instrument the anterior pillars may be easily separated after repeated sittings, and my experience has been that in a fair proportion of cases the operation is followed by a diminution in the size of the tonsil. The most useful instrument is that known as Ponds tonsil hook. There are cases where this instrument will not work, but I believe that in a great many cases if the anterior pillars can be separated a further operation is averted.

Dr. Wright also said, that galvano-cauterizations of the tonsil was not necessarily followed by much pain. In this, his experience is entirely at variance with mine I have always made it a habit to ask if the patient had suffered much from the previous operation, and without an exception the answer has been that the throat has been very sore, and swallowing very painful, and oftentimes pain extended to the ear. Of course, some cases are worse than others. I use great care not to touch the pillars and always use the puncture. It is a painful, tedious method of reducing the tonsil, but we are sometimes forced to resort to it on account of the dangers or objections attending other methods.

Dr. Delavan said : there is probably no operation in surgery which has been performed any considerable number of times without accident. There is at least one case on record in which death from hemorrhage followed amputation of the uvula, while Carroll Morgan has reported (Trans. Amer Laryngolog. Ass'n. 1886) twenty-two cases in which severe bleeding was caused by this usually trivial operation. The statistics of almost any surgical procedure, no matter how simple it may be, would probably show similar results, yet no one doubts the value of these operations nor urges their abandonment.

Dr. Delavan stated that he had had a case of secondary hemorrhage following eight days after the application of the galvano-cautery to an enlarged tonsil, and said that similar cases had also been reported by Capart and Werner. He asked if any of the gentlemen present had seen like instances.

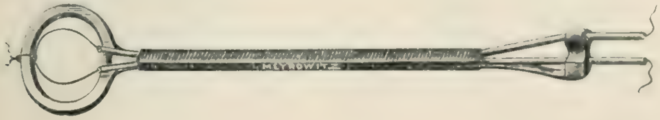
The chairman remarked that such a case was at present under observation at the Manhattan Eye and Ear Hospital, and invited Dr. F. E. Hopkins to give the points in its history.

Dr. Hopkins said: " we have only the patient's word in regard to the secondary hemorrhage. It occured a week after the operation. She lost some blood as a result of coughing.

I might mention a few points in this case. The patient had two tonsils to be removed; but suffered some damage to the pillars in removal of the first with Wright's amygdalotome, so I used a snare for the second one. Having no platinum wire, I took ordinary steel wire and found it could be perfectly heated, and could be adjusted over the tonsil with great facility. I see no reason why steel wire can not be used.

Dr. Myles remarked that electricians claimed that steel wire always melts.

The chairman in reply to Dr. Myles, said:—It does not melt at a heat sufficient to cut through the tonsils. It might melt if brought to a white heat, but such a degree of heat is unnecessary, and steel wire is much more easily adjusted than a platinum loop. The irido-platinum wire, suggested by Gleitsmann, is also more easily applied than the plain platinum wire. I show you here a simple device which enable one to adjust the loop with perfect ease. It has an additional advantage in protecting adjacent parts from damage by heat. It consists of the usual double canula attached to and insulated from a steel shaft terminating in a ring. The ring is intended to go over the tonsil carrying with it the loop of wire to which it is attached by a fine thread. In manipulating the instrument the ring should lie to the outside so as to push away the tongue and the palatal folds, the loop should be pulled down upon the tonsil as close as possible before the current is turned on, and the current should be intermittent and not too strong, gentle traction being made upon the cooling wire. The foregoing precautions being observed this instrument will be found to work satisfactorily. While in most cases excision of hypertrophied tonsils is preferable, in a small percentage of cases we are forced to resort to another method. Under such circumstances the electric cautery seems to meet the requirements—electro-puncture when the tonsils are flat and adherent to the pillars, and the electric tonsil snare when they are protuberant. It is very clear that no one method is suited to every case.



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EXTRACTION OF STEEL FROM THE INTERIOR OF THE EYE WITH THE ELECTRO-MAGNET.*

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The use of the magnet in removing steel from the eye has been suggested and practiced at various times in the past, but the merit of effectually introducing it and stimulating the profession to examine into its utility is due, first, to Dr. W. A. McKeown, of Belfast, Ireland, who published in the "*British Medical Journal*," Vol. 1, 1874, his experience with the permanent magnet constructed with a tapering point; and to Dr. J. Hirschberg, of Berlin, who published in the "*Archives of Ophthalmology*", Vol. X, 1881, the results of his experience with the electro-magnet as most ingeniously adapted to the eye by himself. Since then various forms of both permanent and electro-magnets have been constructed, and every good ophthalmic surgeon makes one of these instruments an essential part of his armamentarium. The permanent magnet however, has so little power of attracting iron as compared with the electro-magnet that the latter has quite superceded the former. Hirschberg's electro-magnet is, perhaps, the form most used at the present time; yet, of all with which I am acquainted, this is the most cumbersome and unwieldy.

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* Read before the New York State Medical Association Nov. 15, 1892.

It was upon the failure of a Hirschberg magnet in the hands of a friend to serve the purpose desired, together with peculiar circumstances pressing upon me, and with a desire to save a patient's only eye, that I was led in 1884 to devise an instrument that seemed to me to be more in accord with the needs of the case then put into my hands. I submitted the plan for an electro-magnet to a practical electrician of my city, who made for me the one heretofore published in the "*Buffalo Medical and Surgical Journal*" for July, 1888. Geo. Tiemann & Co., of New York, have at my suggestion recently made some improvements in its construction, preserving at the same time the essential features which distinguish the original one.

The advantages claimed for this magnet are:—Its great power of attraction, its lightness, its small size, and its shape, most convenient for manipulation. With this instrument I have extracted steel from the interior of the eye in the following cases*:—

Case I. M. S., aged 43, boiler maker, was struck in his left eye, June 18, 1884. The sight, he says, was destroyed at once and an ophthalmic surgeon enucleated the ball.

On the morning of the 27th of August following, two months after the accident to the left eye, while striking a "sett" a chip of steel flew into the right eye. The eye "watered" some afterwards, but there was very little pain, and the vision was "pretty good". Attempts were made on the 28th by a fellow practitioner to extract the steel through the wound produced by it by means of a Hirschberg magnet, but without success. The doctor declined to make further efforts to get the foreign body, and the patient was placed in my hands on the evening of August 30. The eye at this time was in constant pain, with a "pricking" sensation in its upper part. Vision was reduced to counting fingers. There was considerable lachrymation, the lids were somewhat swelled, the eyeball was very red, and the conjunctiva of the lower part was chemotic. There was a wound from two to three millimetres long at the junction of the lower part of the cornea and sclera. This was still open and a bead of vitreous was pressing through it. The pupil was irregular in shape, a piece of iris evidently having been cut off in the direction of the wound. The ophthalmoscope showed the fundus to be greatly obscured by hemorrhage or inflammatory products in the vitreous, and the steel could not be seen. I was assured, however, that it had been seen in the vitreous. The lens appeared to be perfectly transparent, the wound and field of previous operations having been through the suspensory ligament.

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* Cases I and II were published in the *Buffalo Medical and Surgical Journal*, July, 1888.

The case did not present a very hopeful prospect; but as this was the only eye left to him, I was willing to add my efforts to those that had already been made to extract the steel, and if possible, save at least a little vision. The first thing needful, however, was a good electro-magnet, and this I did not possess, and my only means of obtaining one within a brief time was to have one made. I at once applied to an electrician of my city, and suggested to him how one, in my opinion, should be made. At 10 o'clock the next day he had one ready.

At 11 o'clock, a. m., August 31, just four days after the injury, I proceeded with my proposed operation. The patient being anæsthetized, I dissected back a small triangular flap of conjunctiva from the sclera between the equator of the ball and the ciliary region, and between the external and inferior recti muscles. After the hemorrhage was stopped I made an antero-posteror incision through the sclera into the vitreous. This incision was about three millimetres long. A few drops of straw-colored fluid escaped. Through this incision I introduced into the vitreous an extension-point of the electro-magnet about one centimetre in length and one millimetre in diameter at its end. I directed the point at first towards the center of the ball and posteriorly, but found nothing. I then directed it forwards, when I both felt and heard a distinct click which was also heard by the bystanders. On withdrawing the point the steel came with it firmly held in its magnetic grasp. It was a thin scale about three millimetres in length and one and a half in width. The conjunctival flap was replaced over the incision and sutured at its apex.

Very little reaction followed the operation, and both the original and operative wounds healed kindly. After several months the opacities had cleared up in the vitreous, and the patient was able to read No. 2 Jæger at 14 inches with the aid of + 1.00 D. glass. The visal field was considerably contracted, most, however, on the inner side. The ophthalmoscope showed marked choroidal changes such as are found after choroiditis, and these were numerous, but most marked in the lower and outer parts of the fundus. The patient reads a great deal and is enabled to earn an independent livelihood.

Case II. April 5, 1888, I was invited by Dr. Frank W. Abbott, of Buffalo, to assist in the following case: On April 3, Miss A., about 20 years of age, was stitching leather with a sewing machine, when the needle broke and a piece struck her right eye. She applied to Dr. Abbott for advice, not, however. suffering much distress or pain. On examination, there was scarcely any evidence of injury, except that the interior chamber was obscured with blood. A solution of atropia was instilled, and she was asked to return in two days. At this time I was invited to see the case. The blood had become absorbed, and the pupil was nearly at its maximum dilatation, thus permitting an easy examination of the fundus. The ophthalmoscope showed all the media to be transparent. A piece of the sewing-machine needle could be distinctly seen in the vitreous, projecting from the anterior and inner part of the cavity directly towards its center. A slight mark could be distinguished externally at the inner corneo-scleral junction, indicating the point of its entrance. It had evidently passed through the iris, and nearly through the ciliary body by which it was now firmly held. The eye was slightly red and irritable.

Arrangements were made for an operation on April 6th, at which I assisted with my electro-magnet. The patient being anæsthetized Dr. Abbott excised a piece of conjunctiva immediately posterior to the point of entrance of the needle on the inner side of the ball over the cilliary region. The hemorrhage was stopped, first using pieces of ice, but afterwards cotton steeped in hot water, which was much more effective. He then made an antero-posterior incision directly down to the steel through the sclera and ciliary body into the vitrous cavity about three millimetres long. The magnet being in readiness, I introduced a small extension-point through the incision, and it at once grasped the broken needle, but without loosening it. I held it steadily with the magnet while the doctor enlarged the incision anteriorly until it was entirely disentangled, when it was easily withdrawn, adherent to the magnet.

The conjunctival wound was closed by two sutures passed perpendicularly to the sclerotic incision. The patient was kept quietly in bed a few days, with the eye bandaged, and atropia was occasionally instilled.

I examined the eye four weeks after the operation, and it appeared to have fully recovered, and vision was, the patient said, "as good as ever."

Case III. Patrick H. E., aged 28, boiler-maker, while caulking a boiler, using a hammer and caulking tool, on August 6, 1888, was struck by a scale of iron on the outer part of the cornea of the left eye. He visited an oculist of Buffalo who examined his eye and told him that there was steel in it. He prescribed for him a two-grain solution of atropia to be instilled every two hours, and directed him to call in two days. The patient then went to his family physician who advised him not to wait so long, and sent him to me. I found a vertical wound in the left cornea one millimetre to the inside of the outer margin, and two millimetres long. The iris beneath also had a vertical wound a little shorter and slightly gaping. No foreign body could be seen by an external examination, but with the ophthalmoscope the fundus appeared clear posteriorly, while to its outer side there was a dark, opaque spot behind the region where the iris was wounded. The vision was normal. There was no pain in the eye, but there was some lachrymation, and the eyeball was reddened. I diagnosed steel in the eye, and proceeded to find and remove it, if possible, with the electro-magnet. I used a small extension-point a little less than one centimetre in length. After thoroughly cocainizing the eye I introduced this through the wound of the cornea and iris produced by the foreign body, carefully avoiding the crystalline lens. I passed the point to the depth of about one-half centimetre, when the iron struck it with a distinct click which was heard by all present. It was firmly held by the magnet and was drawn out through the wound by a little effort and after enlarging the wound slightly with a knife. The edges of the steel being ragged and catching on the surrounding tissues, the magnet was aided by forceps in the extraction, after the steel was brought to the wound.

The steel was a thin scale seven millimetres long and two millimetres wide at its widest part, and weighed one grain. The crystalline lens did not seem to have been wounded either by the passing in of the steel or its removal. The eye was dressed with 1 to 4000 bichloride solution and a four-grain solution of atropia ordered to be used every two hours. The eye was considerably inflamed for two days after the operation, but from that time on recovered rapidly, and on Sept. 29, it was well. There was a slight scar of the cornea, and the iris showed a vertical slit at the point of injury. The crystalline lens was dotted with opacities. The vision equalled No. 60 Snellen at four metres, and Jæger No. 18 slowly at ten inches. The patient was not seen afterwards. In this case the eye was saved, but a traumatic cataract followed which, if successfully removed later, would undoubtedly have given good vision.

Case IV. George C., aged 29, blacksmith, consulted me on the evening of August 6, 1890, for an injury of his eye. That afternoon while cutting a bolt with a "cold-chisel", a piece of the steel flew off and struck his left eye. I found a vertical wound about four millimetres long just outside of the inner cornea-scleral junction, and the iris was protruding through it. The anterior chamber was filled with blood and the fundus of the eye was not visible with the ophthalmoscope. No foreign body could be seen upon external examination, but I was of the opinion that a piece of iron had entered the vitreous space. Under cocaine anæsthesia I cut off the protruding iris and with the electro-magnet armed with an extension point one centimetre in length and one and a half millimetres in diameter at its end I began my search. On introducing the point to a depth of about one-half centimetre it caught the iron with a pronounced click and on withdrawing brought it to the corneal wound. I found it to be a large piece of irregular and ragged contour, and it became necessary to enlarge the wound a little and assist with forceps before it could be drawn out. The conjunctiva was drawn together over the sclerotic wound by a suture. After instilling a six-grain solution of atropia the eye was dressed with 1 to 4000 bichloride solution, and both eyes were bandaged The piece of steel was one centimetre long, one-half centimetre wide, and two millimetres in thickness, and weighed seven grains. Some inflammatory reaction followed the operation, but this soon subsided. The pupil was kept dilated by atropia and the suture was removed on the fourth day. The patient was discharged Sept. 29, with vision equalling No. 24 Snellen at three metres. At this time the media were all clear, but the fundus showed several spots of choroidal atrophy at its inner side.

Case V. Michael B., aged 39, laborer, consulted me Dec. 13, 1890. Two days previously a piece of steel from a hammer struck his right eye. The eye pained him for a short time but has since been easy, and at this time was only slightly red. Vision equalled No. 60 Snellen at one metre. The anterior chamber was normal: pupil normal in size and responded well to light. At the outer part of the cornea, one millimetre inside of its margin, there was a vertical cut one millimetre in length nearly healed. The iris showed a minute vertical opening at its outer side half way between its pupillary margin and periphery, the bottom of which appeared whitish. The pupil dilated readily under cocaine, and the ophthalmoscope showed the lens to be slightly hazy at its postrrior part, and at its outer and anterior portion was seen a milky-looking reflection one millimetre wide starting from the iris wound and running backwards about four millimetres. Instillations of atropia and boracic acid solution were used every four hours.

Dec. 14, 9 a. m., consultation was held with Dr. Abbott who agreed with me that there was steel in the eye. Under cocaine I made a vertical incision of the cornea near its outer margin and over the iris-wound, and introduced through this and the opening in the iris electro-magnet points of different sizes and lengths, but could not find the steel although they were passed deeply into the vitreous as far as seemed prudent. The eye was then dressed, and atropia and boracic acid solution ordered as before.

Dec. 16, the eye was painful and much inflamed. Gave the patient chloroform and made another attempt to find the steel with the magnet and succeeded, introducing the point through the same wound as before. The steel was very minute in size, being a thin scale two millimetres in length and half a millimetre in width. Inflammation, which had already begun, continued and resulted in panopthalmitis necessitating enucleation of the ball at the end of four weeks.

Case VI. Fred T., aged 39, laborer, visited me Dec. 5, 1891. He stated that the day before while cutting off a rivet from a salt evaporating-pan with a chisel he was struck in the right eye by a piece of iron. Upon examination of the eye I found it inflamed, with a wound in the cilary region near the outer border of the cornea extending obliquely downwards and inwards and about six millimetres in length. The iris was protruding between the lips of the wound, and both the aqueous and vitreous chambers were filled with blood. Vision equalled no perception of light. Under cocaine the iris protrusion was cut off. An exploration was then made with the electro-magnet, using an extension point one centimetre long and two millimetres in diameter at its end. On passing the magnet about three millimetres into the vitreous and directing it backwards some stagnant blood flowed out and the iron was attracted to the magnet with a pronounced click, as is usual in such cases. The piece of iron seemed to lie across the wound and it was worked down and back with a silver probe, and after a little came out end-wise without enlarging the wound. I instilled a four-grain solution of atropia and dressed the eye with 1 to 4000 bichloride solution.

The iron was a thick scale twelve millimetres long by four wide, and weighed three grains. Considerable inflammation followed, the conjunctiva becoming chemotic, and the eyelids swelled. This subsided, however, in a few days, when he returned to his home fifty miles distant, after which I lost sight of him.

Case VII. William M., aged 22, boiler-maker, called at my office Nov. 30, 1891, and stated that he had been struck in the left eye about an hour previously with something while caulking a boiler with a hammer and caulking tool. I found some blood in the lower part of the anterior chamber, and there was a cut through the sclera just below and to the inner side of the cornea extending horizontally inwards and about three millimetres in length. No foreign body could be seen by external examination. The pupil was dilated under atropia, but the ophthalmoscope showed the fundus to be clouded with blood. The patient had no pain. Vision equalled No. 5 Snellen at two metres.

My diagnosis was steel in the vitreous humor. Under cocaine I introduced a point of the electro-magnet through the wound, and, at a depth of not more than three millimetres caught a piece of iron and drew it out by a little coaxing without the aid of any other instrument. The conjunctiva was drawn together over the sclerotic wound, a solution of atropia was instilled into the eye and a bichloride dressing applied.

The steel was a thin scale about seven millimetres long, one and one-half wide, and weighed one-half grain. The eye recovered without any inflammatory reaction, and at a subsequent examination the vision was found to be No. 5 Snellen at five metres.

Case VIII. Arthur S., aged 24, machinist, on January 14, 1892, while holding a mandrel for another man to strike with a sledge-hammer, a piece of something flew and struck his right eye. He consulted me about four hours after the injury, and I found a clean-cut, vertical wound at the outer margin of the cornea in the sclera. It was about three millimetres long and the periphery of the iris was drawn into it, giving the pupil an irregular shape and a displaced position. With a probe, gently used, the iris and pupil were restored to their proper position, when an opening was detected through the iris and suspensory ligament of the lens. The eyeball was red, but the patient complained of very little pain. I could not see the bottom of the fundus with the ophthalmoscope on account of the blood in the vitreous. Vision equalled No. 9 Snellen at one metre

My diagnosis was a piece of iron in the vitreous humor, but on several carefal trials with various sized points of the electro-magnet introduced through the wound I could not find any. Failing in these efforts, I instilled a six-grain solution of atropia and applied bandages, with directions to call again the next day.

Jan. 15, 10 a. m. The eye had been comfortable since last visit. Vision equalled No. 9 Snellen at one and one-half metres. The pupil was dilated and with the ophthalmoscope I could see, at the upper and back part of the fundus to the right side, a black opacity appearing to be about six millimetres in diameter, making positive the diagnosis of steel in the vitreous chamber. The corneal wound had closed and the aqueous humor had re-formed. Atropia was again instilled and the eye bandaged.

Jan. 16, the eye was more inflammed. Vision equalled No. 24 Snellen at one metre. Dr. Abbott was called in consultation and agreed with me as to the diagnosis and that another attempt at extraction should be made. After cocainizing the eye thoroughly a small conjunctival flap was raised from the sclera on the outer side of the ball between the external and inferior recti muscles. After the hemorrhage was stopped a horizontal incision was made through the sclera into the vitreous about four millimetres long. Through this I introduced an extension-point of the electro-magnet which I had curved somewhat, whose length was about one centimetre, and end one and one-half millimetres in diameter. At a depth of about five millimetres the magnet caught the piece of iron, and it was easily brought out. It was a thin scale about two millimetres long and one and one-half wide and weighed about one-fourth of a grain. The conjunctival flap was replaced with a suture at its apex, atropia was instilled and the eye bandaged.

Jan. 17, 11 a. m. He had very little pain during the past twenty-four hours. Pupil was well dilated and vision equalled No. 9 Snellen at two metres. The eye afterwards healed well, but on March 22, vision was lowered to a few of No. 12 Snellen at two metres. The media were transparent.

Case IX. John S., aged 20, boiler-maker, consulted me Feb.

21, 1892, with a history that two hours before, while driving a steel plug into a boiler, a piece of iron struck the left eye. There was a small wound through the lower lid below the central part of its margin, and one through the sclera a little to the left of the lower margin of the cornea. Beneath this a small shiny spot could be seen in the iris. A fine probe showed that the wound extended into the vitreous at this point. Vision equalled No. 36 Snellen at one metre. Under cocaine the electro-magnet was applied, introducing a small point one centimetre long through the original wound which had been slightly enlarged with a knife. At the depth of about three millimetres the magnet caught the piece of steel, and after several attempts it was drawn out. Atropia was instilled and the eye was dressed antiseptically.

The steel was a thin scale about one and one half millimetres square. The eye made a rapid recovery, and on May 29, with—3.00 D, vision equalled No. 18 Snellen at five metres, and the media were transparent.

Case X. W. T. G., aged 30, machinist, was brought to me by Dr. A. G. Bennett for consultation Aug. 8, 1892. Six weeks before, he was struck in the left eye with a piece of steel. Vision was impaired at once. The patient had a druggist look at his eye but no foreign body could be seen. He gave him some "eye-water" which he used and the eye gave no pain or trouble. But, as the vision did not improve, he applied to Dr. Bennett a few days ago who examined him and made a diagnosis which I consider most commendatory to his judgment and skill as a young practitioner. My own examination simply confirmed his diagnosis.

Externally the eye appeared perfectly normal, except that a minute hole could be seen in the iris at its inner part near its periphery. The pupil being dilated with a mydriatic, the ophthalmoscope showed a few minute opaque dots in the lens as if "peppered" in half a dozen places; but otherwise the media were transparent. Every part of the fundus was normal except at the macular region. Here, extending from the macula lutea directly upwards was a black line, in length a little less than the diameter of the optic disc, and in width a little more than the diameter of the largest retinal vein. It showed a slight lustre, and on each side was seen a white line, evidently the sclera exposed through the split choroid. Around this was a line of pigment. Peripheral vision was apparently normal, but central vision and that part of the field a little below the center was lost. At a distance of five metres the central scotoma was about the size of a man's head. I did not take a perimetric chart of the field. By looking a little eccentrally vision equalled No. 60 Snellen at five metres. There was no doubt as to the correctness of Dr. Bennett's diagnosis of steel in the retina at the upper part of the macula lutea.

What should be done? It was agreed that the eye would be better off with the steel out; that very little danger would attend a careful attempt at extraction, and that if the effort was unsuccessful, the eye would not suffer more in the end.

The eye, therefore, was thoroughly anæsthetized with cocaine and the proposed operation begun. A triangular conjunctival flap having been raised from the sclera in front of the equator and between the external and inferior recti muscles, hemorrhage stopped, and a horrizontal incision five millimetres long carried through the bared sclera into the vitreous by Dr. Bennett, I placed the patient in a convenient position in which I could use both the ophthalmoscope and the electro-magnet. I used an extension-point one and one-half centimetres long with end one millimetre in diameter and curved so as to be directed easily toward the macula. With my right hand I introduced this point through the sclerotic incision, and under the clear observation of the fundus with the ophthalmoscope held in my left hand, passed it through the vitreous to the macular region, lightly touched the black object, and then withdrew the magnet with the offending body on its point. The single attempt secured the coveted trophy.

The conjunctival flap was replaced and held by a suture at its apex, atropia instilled, and the eye bandaged. No reaction followed the operation, and the eye rapidly recovered. The steel extracted was a minute scale one and one-half millimetres long and three-fourths of a millimetre wide.

Oct. 23, 1892, eleven weeks after the extraction the eye appeared to be normal on external examination, and with the ophthalmoscope, the pupil being dilated with a mydriatic, the lens presented the same appearance as before the operation; the vitreous was transparent, and at the macular region at the point from which the steel had been extracted there was an area of about the same extent (although a little wider) as seen at the first examination, resembling in disturbance of pigment and color a patch of choroidal atrophy. Vision was the same as before the operation, but the eye was more sensitive to light.

This case to me is a most interesting one, and is one among a very few on record in which steel has been successfully extracted from the retina. The injury which the steel inflicted was peculiar in view of its location, and although the vision was permanently impaired by it, the operation of extraction did not further lessen it.

REMARKS:

In this group of ten cases, all that I have seen, it will be noted that in every case the steel was found in some part of the vitreous space. In every case it had entered near the corneo-scleral junction and passed through the iris and suspensory ligament or ciliary body. In one case it passed through the lower lid first, and then through the cornea and iris into the vitreous. In eight cases it seemed to be resting in the vitreous. In one it was lodged in, and held at its outer extremity by the cilary body, and in one it was imbedded in the retina. The size of the steel varied from a minute scale to a large piece weighing seven grains. In every case but one the accident occurred while striking with a hammer and the steel was propelled with great momentum. One eye was lost by infection, although antiseptic precautions were taken in this, as in all the other cases. In three cases the first attempt at extraction failed. In one of these a second attempt through the original wound, and in two through a sclerotic incision, was successful. In the first of these the eye became infected and was afterwards enucleated. The other two recovered with useful vision. In seven cases the steel was extracted through the original wound at the first attempt. In one the first attempt was by an incision through the sclera and was successful.

These cases only add further and impressive illustrations to those furnished by other ophthalmic practitioners of the benefits of the electro-magnet in the class of injuries under consideration. The lesson is that with it a great majority of the cases in which iron has been driven into the cavities of the eye, this can be saved with more or less vision, while without it almost every one would be totally lost, and perhaps cause, also, the loss of its fellow eye. In some cases the injury to an eye is so great that no attempt should be made to save it by removing the steel, but it should be enucleated or eviscerated at once.

In considering the propriety or need of using the electro-magnet, a correct diagnosis is always desirable, but this is often not easily arrived at.

The history of the case that in hammering or working iron a splinter has struck the eye; that it has made a wound through its coats, and that the piece was not afterwards found by the patient, makes the presumption very strong that it has entered the eye. As a rule a minute object striking the eye with sufficient force to cut through its coats is carried on into the non-resisting fluids within by its own momentum. The examination of the eye by oblique illumination and the ophthalmoscope, the pupil being dilated, if possible, sometimes gives negative and sometimes positive information.

Steel may be lodged at any point,—in the cornea or sclera, in the iris or lens, or in the vitreous or inner coats of the eye. Blood and inflammatory exudates and opacities of the cornea or lens obscure the view. But when there is no obscuration, steel is easily recognized by its black appearance, or by its shining lustre from the reflection of the light from the ophthalmoscope or focal illumination. This lustrous reflection often replaces the dark appearance of the iron. If the iron is in the vitreous cavity, it will appear when seen with the ophthalmoscope very much magnified in size.

The sensations of the patient or the state of vision are of very little value in making out a diagnosis. The diagnosis is positive when the foreign body can be seen; when it cannot be seen it is probable in different degress of certainty according to the history of the injury and the character of the wound inflicted.

In using the electro-magnet in a case in which the steel has either probably or positively entered the eyeball, it should be made to pass as directly as possible to the supposed or known location of it in lines of least resistance and through an area of least functional value. Sometimes the accident-wound meets these requirements, but oftentimes it does not. If steel has penetrated into the vitreous through the cornea near its margin and through the iris and suspensory ligament of the lens, there is always great danger of adding further traumatism to the parts, and especially to the lens. That part of the ball through which the magnet can be introduced with least danger to important structures and to sight, and at the same time most accessible to every point within the vitreous chamber, is the sclera just in front of the equator of the ball, and preferably in most cases on the outer side between the external and inferior recti muscles. It is better to make the sclerotic incision after dissecting up, at the place chosen, a small triangular flap of conjunctiva, or excising a piece, and stopping the hemorrhage.

Had I selected this position for operative procedure in case No. V, instead of endeavoring to follow the track of the steel, I have no doubt that I would have found and removed it on the first attempt and saved the eye.

In cases Nos. I and VIII, the effort to extract the steel through the corneal and iris wound failed after several trials. But on opening the sclera as described above, the first introduction of the magnet secured and brought it out.

Case No. X shows also how the magnet-point may be passed directly to the macular region (and indeed to any other) with the minimum of operative traumatism to the eye. It is also a forcible illustration of the greater ease and safety with which a piece of steel imbedded in the coats of the eye posteriorly can be reached than by more extended operative procedures.

The early use of the electro-magnet is preferable to waiting till pathological processes follow the introduction of the steel. Sometimes, it is true, the eye will tolerate steel for an indefinite period of time, perhaps for years, but this is the exception rather than the rule. By waiting, the steel becomes embedded in exudates, when the magnet cannot attract it at all, and if the eye does become inflamed, enucleation is then the only safe treatment. The proper use of the magnet is usually so successful when applied early, that it seems to me there is no alternatve between immediate operation and delay.

The form of electro-magnet, especially of the extension-points, is a matter of no little importance. The magnet itself should be as light as possible consistent with sufficient attracting power, and of a shape convenient for handling. The extension-points should be as near as practicable to the coil around the core, and no longer than is necessary to reach the supposed location of the steel, and certainly never more than two centrimetres (¾ of an inch), and at the ends from one-half to one and one-half millimetres in diameter. The power of attraction diminishes very rapidly as the end is lessened in size or carried farther from the coil around the core. Again, the points should not be rounded, but flat at the ends, and also on the sides from the ends backwards for a short distance, as by this a larger surface of contact is presented and the holding-power increased. The magnet which has served me so well is constructed upen these principles.

In conclusion, I submit this report to emphasize anew the utility and benefits of the electro-magnet in ophthalmic surgery; to recommend its early employment; to call attention to a special form of instrument which, I believe, better than some others, fulfills the requirements needed; and in addition, to advocate a more general adoption of the sclerotic incision, as the safest method of reaching steel when it lies at any point, supposed or known, in the vitreous humor or inner coats of the eye, even to the disregard of the original wound in many cases.

212 Franklin Street.

THE POULTICE IN OPHTHALMIC PRACTICE.

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There was a time when the poultice was far more fashionable than it is at present; and yet it is capable of doing the same good now that attended its application in the remote past. Introduced, probably, before the birth of scientific medicine, it has been, at all times, a useful means of treating inflamed parts situated so as to be influenced by its warmth and moisture. Correctly made and properly applied it so acts on the cutaneous and vaso-motor nerves as to stimulate the circulation in, and lessen the congestion of, the inflamed part or organ. It promotes absorption of effused material and in this way, in part, is to be accounted for the marked relief from pain that attends its use. It hastens resolution in many cases, while, in some, it has been thought to promote suppuration.

Used but little now by the general practitioner and surgeon, it is almost an unknown factor in Ophthalmic practice. I was taught to look upon it as a thing unclean, and that it ought to be avoided. I carried out this teaching in practice until convinced that, in suitable cases, the poultice is a great means to a good end.

The following case converted me to the thought that something good can come from the use of the poultice:

A young man received an injury four years ago which resulted in the development of cataract. Because the white cloud in his pupil marred his general appearance, he sought the advice of an oculist about one year ago. He was told that by an operation, usually free from danger, the cataract could be made to disappear.

The operation with the needle and the process of solution were explained to him. Having consented to the operation it was performed in the usual way. Only the ordinary amount of reaction followed. Eight weeks later, with every antiseptic precaution, a second needling was resorted to, but this time with a most unhappy result. The eye became very red and painful about forty-eight hours after this needling, and in twelve hours there was every indication of a suppurative irido-cyclitis. The usual treatment, including hot fomentations, was resorted to, but without checking the inflammatory process. The pain in and about the eye continued severe except when under the influence of heat or morphine ($\frac{1}{4}$ grain hypodemically). On the third day Dr. Hale, who operated on him, brought him to my office for consultation. There was much pus in the eye, and already the posterior layers of the cornea seemed to be involved in suppurative action. We agreed that the eye should be enucleated, and that at once. To this the young man demurred.

Not getting relief from what the doctors had been doing for him, two weeks later he decided to accept the advice of some one at his home to discontinue everything that had been prescribed, and try the flax-seed meal poultice. Soon after the first was applied his suffering vanished, the swelling of the lids and the redness of the conjunctiva grew less each day. Evidently the absorption of the pus in the eye began at once, since at the end of one week it was all gone. Dr. Hale watched the effect of the poultice and unwillingly acquiesced to the radical change of treatment. Later the young man had every appearance of being pleased both with his improved condition and with the idea that, although he had never studied medicine, he was a better doctor than two men that had.

Dr. Hale gave me this history and a little later was kind enough to send the young man to my office for inspection. The eye, though in good shape and far more attractive than an artificial eye, was void of vision. The pupil had contracted and was filled with a membrane: and doubtless the deeper structures of the eye had been injured.

Impressed with this case I decided to side-track my prejudice against the poultice and try it as opportunity might offer. The first case for whom I prescribed the poultice was a negro man suffering with abscess of the cornea. I expected under any treatment that the abscess would run the usual course, the pus escaping anteriorly leaving an ulcer, or posteriorly developing an hypopion. I ordered a poultice of flax-seed meal to be applied and to be renewed as often as it became cool or dry. His suffering began to disappear with the first application, and soon amounted to very little. He slept well during the night. All symptoms were better the next morning. There was no increase in the quantity of pus. The poultice was continued, also the solution of atropia and boracic acid, for the next twenty-four hours with marked improvement. Already the quantity of pus in the cornea was less. The next day the poultice was applied for two hours and then intermitted for the same length of time. The absorption of pus had continued. The patient was still free from suffering. In five days the pus had been absorbed, and the patient was ready to be dismissed. The iris had been inflamed before I saw him and, not having been brought under the influence of atropia early enough, there was complete posterior synechia.

The next case was one on whom I had operated for cataract by extraction. At the end of forty-eight hours there was evidence of trouble. The corneal wound had inflammed and was suppurating ; the iris had inflammed and there was pus in the aqueous chamber, the pupil being filled with it. He was suffering great pain in his eye and head. His scalp was tender to the touch. The corneal wound was touched with a strong solution of silver nitrate (gr. xx to ℥i) which was at once neutralized with a solution of potassium iodide (gr. xxx to ℥i). This was done, after a thorough cleansing with a warm boracic acid solution, to check the suppurative process in the wound. Hot cloths were applied and anodynes were given internally, and other usual treatment was continued. His suffering was only partially relieved by these means. At the end of another twenty-four hours the corneal wound was found open, and there was an increase of pus in the aqueous chamber. The condition of his eye looked hopeless. Another thorough cleansing was resorted to and the silver was again applied as on yesterday. A flax-seed meal poultice was ordered to be applied as hot as the patient could bear it, with instruction that it be renewed as often as it became uncomfortably cool or dry. The oil silk applied over it caused the heat and moisture to be retained from two to three hours. No anodyne was given. Some relief from suffering was experienced soon after the first poultice was applied, and at the end of twelve hours he was comfortable. The wound had a more healthy appearance but was still leaking. There had been no increase of pus in the aqueous chamber.

The conjunctival sac and corneal wound were again thoroughly cleansed, and the atropia solution (with gr. $\frac{1}{8}$ of eserine added) was continued.

Poultices were ordered to be continued through the night. He felt much better the next morning. An examination of the eye showed marked improvement. The corneal wound was still leaking but there was not so much pus within the eye. To make sure of checking the suppuration of the wound another application of the silver was made. The cleansing, poultices, and atropia and eserine solution were continued as before. Noticable improvement occurred every day, and before the end of a week the pus had been absorbed and the corneal wound was healed. On the fourth day the poultices were applied intermittingly, from two to four hours intervening. The renewal depended on the return of a sense of uneasiness in eye or head. By the end of the week these were discontinued. The redness, swelling, etc , usually found in such conditions passed rapidly away. A pupillary membrane formed, but this was divided at the end of four weeks, comparatively good vision resulting. The patient was a negro ignorant of letters, therefore no *exact* estimate of the state of his vision could be made.

It would make this paper too long to give the history of the few other cases in which the poultice has been used. The relief of suffering was prompt and complete in nearly every case. When there was suppuration in the cornea or within the eye its progress was checked and the absorption of the pus was promoted.

The chief indication for the poultice in ocular troubles is pain which it promptly relieves. In purulent conjunctivitis it would do harm by causing the pus to be retained too long; and in ordinary conjunctivitis, because of the absence of severe suffering, it is not indicated.

In all forms of ocular (not conjunctival) troubles attended by by suppuration the poultice is a therapeutic means of great power, and is never dangerous. In iritis of any form it will do good in relieving pain and lessening congestion. In one such patient, now under treatment, the soothing effect of the poultice aided atropia in dilating the pupil. It helped to cut short the duration of the disease in all cases of iritis in which I have used it. In inflammatory glaucoma, before an iridectomy is done, it will relieve greatly the suffering of the patient, as was shown in one case that was brought later to me for an operation. In orbital cellulitis I believe it to be the means, if applied early, of preventing suppuration; and I believe it capable of lessening this process if applied later.

Flax-seed meal has been the material used in all the poultices I have used thus far. This I have mixed with boiling water in a plate already hot. The proper consistency is attained as rapidly as possible, and the mass is spread on half of a piece of cloth three inches wide and six inches long, to the depth of $\frac{1}{8}$ to $\frac{1}{4}$ inch, and not entirely to the edge, when the other end of the cloth is folded over it. The under surface is then applied to the eye, so that the upper and inner borders rest on the brow and nose, thus lessening the pressure on the eye. A piece of oil silk four inches square is then placed over the poultice and the whole is kept in place by a light four-tail bandage. When cool or dry another poultice should be ready for application on its removal. The poultice should be in continuous use for the first twenty-four to forty-eight hours, even if the suffering is much sooner relieved; afterwards it can be used intermittingly as indications may arise.

The mucilage developed by mixing the hot water with the flax-seed meal causes the poultice to be less irritating to the delicate skin than the application of hot cloths. The comparative infrequency with which the poultice has to be changed is decidedly in its favor. I believe that the mucilage by being soothing to the skin helps the heat and moisture of the poultice in accomplishing the good effects which attend its use.

[The above was written one year ago. I have since then used the poultice in many cases, more particularly cases of iritis, and am more than ever convinced of its usefulness.]

SIMPLIFIED DIAGNOSIS OF OCULAR PARALYSES.

Written for the Ophthalmic Record by

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The difficulty of prompt and correct diagnosis in case of paralysis of the extrinsic muscles of the eyes has at all times been acknowledged by physicians. In fact, even now we must admit the impossibility of absolute certainty, when functional weakness of otherwise healthy muscles complicates paresis of a single one. We do not here care to discuss such cases, nor will we touch upon the subject of paralysis of the oculo-motor nerve in all its divisions, because its picture is sufficiently characteristic to be readily recognized.

The differential diagnosis of paralysis, when affecting a single one of the twelve extrinsic muscles of the eye, will be the subject of our essay. Owing to the various meanings which a symptom can assume in ocular paralysis, all possible factors that might be helpful in diagnosis were formerly enumerated and had to be memorized. It is just for that reason, together with the inverse relationship between ocular perception and projection, that the subject seemed complicated. Now, while a thorough anatomical knowledge of the extrinsic muscles of the eye necessarily impresses a person with their various functions, many seem not to have succeeded in grasping those facts.

If a simple mechanical rule is possible, it is certainly preferable to complicated deductions, for, although the latter may finally be correct and highly satisfactory to the oculist, the patient will usually take them for an evidence of hesitancy and incompetence.

Simplification has been my purpose and I leave it to my readers to judge how much I have succeeded.

For the purpose of binocular single vision it is necessary that the image of an object should fall on corresponding surfaces of the two retinæ. For sharp vision those correlative points are the two maculæ, while for indirect or excentric vision the retinal surface is marked off into well-determined, unvarying places corresponding exactly with an equal arrangement in the fellow-eye. Such points are known as horopteric points.

Whenever the image of an object does not follow horopteric surfaces of both retinæ, single vision becomes impossible and diplopia results.

Double-sight may be either homonymous or heteronymous. *Crossed* diplopia is a term usually preferred to *heteronymous* diplopia.

In homonymous diplopia each eye projects its image on its own side; in crossed double-sight the right image corresponds to the left eye, and vice versa.

It is clear that a ray coming from *above*, in the upright position of the body, will strike the *lower* part of the retina, while light proceeding from the temporal side will fall upon the nasal quadrant. As a result, the retina projects the image in a direction opposite to the point of stimulation. A sentient surface on the nasal side will create an image on the temporal half; stimulation of tho lower half will report an image above.

Diplopia being the most characteristic symptom of paralysis of the extrinsic muscles of the eyes, its mode of production must be thoroughly understood for a correct diagnosis.

The muscles so turn the eyes that an object throws its picture on horopteric surfaces. Both sensations are then fused and projected in the same place. If the muscular action is faulty, the image must fall on a surface away from the horopter, and diplopia occurs. It is evident that such an occurrence is possible only, if the movement of the eyes implies the use of an affected muscle. As long as the paralyzed muscle does not come into play, no disturbance need be felt, hence.

Rule I. *Paralytic squint manifests itself in the direction of the action of the affected muscle.*

The right external rectus pulls the right eye outward, therefore we can prove its paresis by moving the fixation-object (flame) so as to force it to contraction. However, if double-sight occurs under such circumstances, the diplopia might be due to another source. We know that in associated ocular excursions a contraction of the right external rectus implies the same work on the part of the left internal rectus.

In order to tell which muscle causes the mischief we will have to watch the relations of the two images, which is greatly facilitated by giving some mark of difference to the two objects. Covering one eye with a red glass is a very common method and allows a ready distinction between the two flames.

If in the case assumed, the paresis affected the right external rectus, the right eye-ball would remain behind in the test-movement.

The light would fall on a point *internal* to the macula (horopter), consequently provoke an image to the opposite side (right). Instead of meeting in one point, the visual axes are disturbed in their relationship and an image is projected from the right eye away from the virtual fixation point toward the right. The diplopia is homonymous.

As you go on toward the right, the pictures separate, that of the right eye—paralyzed muscle—being in advance.

If the left internal rectus were affected, the left eye would remain behind in the test-excursion. The light would consequently, fall on a point *outward* from the macula, hence the sensation would be projected *inward* (to the right). Instead of meeting in a common fixation point the sensation of the left eye is thus projected toward the right of it. Crossed diplopia results, the image of the left eye being to the right, that of the right to the left.

As you go toward the test-direction (right), the images separate, that of the paralyzed side (left) keeping in advance.

Those observations enable us to tell, without difficulty, in which eye the paralysis is found. But, if two muscles—one in each eye are tested, the pointing out of the sick eye will at the same time determine the muscle affected.

Rule II. *The paralysis is to be found in the muscle of the eye whose image keeps in advance during the test movement: the image lagging behind belongs to the sound eye.*

The two rules just given are quite sufficient for a prompt diagnosis in all cases where the test-movement is brought about by two muscles only, viz. in the horizontal meridian.

Elevation and depression being due respectively to four muscles, a difficulty seems to arise in the application of the second rule. However, another rule removes that obstacle.

Rule III. *In case of paralysis, the recti of the vertical meridians cause crossed, the obliqui homonymous diplopia.*

THE ELEVATORS ARE:	DEPRESSORS ARE:
M. rectus superior dexter.	M. rectus inferior dexter.
M. obliquus inferior dexter.	M. obliquus sup. dexter.
M. rectus sup. sinister.	M. rectus inf. sinister.
M. obliquus inf. sinister.	M. obliquus sup. sinister.

Now, if diplopia were to occur upward, it would be due to the affection of the elevators of one eye. We consequently have to decide between the two superior recti and the two inferior obliques. The kind of diplopia at once rules out two of them. If it be crossed, the recti are diseased, if homonymous the obliques. Having narrowed the number down to two we can dispose of them by Rule II.

If, after diagnosis, we want to compare the various facts concerning the position of the faulty image, we can be informed easily about vertical and lateral separation and also about the divergence of the projected objects by remembering the last rule, which, although not needed for diagnosis, furnishes the data spoken of above as a matter of scientific interest.

Rule IV: *The faulty image will show such a position to the correct one as the eye would assume if acted upon in a normal state by the muscle now paralyzed.*

APPLICATION:

On making the test-movements the patient reports diplopia downward. The depressors must be at fault. (Rule I).

The four muscles concerned in this movement are the inferior recti and the superior obliques of both sides. To apply Rule II we must eliminate two muscles by noting the kind of diplopia. Suppose the latter to be homonymous; this limits the muscles under examination to the superior obliques of both eyes. (Rule III). Now move the flame downward again and notice which image keeps in advance. Suppose it belongs to the right eye, then it must be *its* muscle of the two in question, namely the right sup. oblique. (Rele II).

If now we want to know the position of the faulty image, we will find it downward, outward and tilted toward the nose (Rule IV).

To test the muscles of lateral motion apply Rule I and II. For vertical excursions try successively Rule I, III, II.

The visual field, the poise of the head, and the secondary deviation might also be tested, but, simplification being my aim, I want to state again that the first three rules suffice for the determination of any single one of the twelve ocular muscles in paralysis.

112 S. Eighth St.

"A WEEK IN OPHTHALMOLOGY."

Editor Ophthalmic Record,

In reporting the work done in "The Week in Ophthalmology," in the Philadelphia Polyclinic, I will state that Dr. Jackson opened the "week" with a Clinic at Wills Hospital 15th Dec. 2 p. m. He did some cataract extractions and discissions, and showed many other interesting cases, among them, one a case of prolapse of iris following cataract extraction without iridectomy or preliminary iridictomy. This sequel "it is said is more apt to attend extraction without iridectomy." Retraction of iris had almost taken place in this case, only a very small *bead remained* which has finally flattened and smoothed down so as to to be scarcely perceptible. This is a popular operation with Professor Jackson.

At 4 p. m. Prof. Risley followed Professor Jackson, at the Polyclinic on "Methods of Diagnosis of the Muscular Anomalies," which was presented in a clear, forcible and unique way.

At 8 p. m. Professor de Schweinitz demonstrated, in his happy and magnificent style, "the use of the Ophthalmometer in the measurement of Corneal Astigmatism." Besides the numerous clinics and hospital advantages, special instructions were given in ophthalmoscopy, retinoscopy, ophthalmometry and on muscular anomalies, their diagnosis and treatment, and refraction, fitting of spectacle and eye-glass frames, optical conditions of mounting lenses and illusions evoked by lenses.

Tuesday evening Dec. 20th, 8 p. m., "Conference on cataract extraction" was to be held at the Polyclinic but changed to College of Physicians and Surgeons, where Dr. Randall gave a talk on the "linear incision." Dr. Risley discussed "the treatment of cataracts." He prefers a preliminary iridectomy. All who discussed the subject preferred a prelininary iridectomy as the safer and better method. Dr. Jackson stated, he was having good results without iridectomy, and endorsed highly the operation of simple extraction through a dilated pupil. The after-treatment of cataract operations was discussed freely by Doctor Jackson, who prefers the closed treatment of eye with cotton and compress bandage for twelve hours, when, if the eye shows much injection of vessels and redness, he changes to the open treatment—Isinglass plaster over the lid. The cotton and bandage may act as a poultice to the eye and cause irritation. To prevent prolapse of iris in simple cataract extractions eserine in $\frac{1}{4}$ to $\frac{1}{2}$ grain to ounce is instilled into eye.

At another conference at Polyclinic the subjects of "glaucoma and optic neuritis and optic atrophy" were discussed freely, especially by Professors Jackson and de Schweinitz. Prominent facts elucidated were the rarity of simple glaucoma, the frequency of optic atrophy. Eserine, chloral and strychnia were advised in treating the former, and the difficulty in knowing just the right time to do iridectomy in simple glaucoma was emphasized. White's operation is often done for ripening the lens.

The ophthalmic staff may have equals as teachers, but no superiors.

Many of the matriculants at the Polyclinic have been here six to twelve months and, with long previous study, they go away first class men. The special "week in ophthalmology" was attended by men in actual ophthalmic practice, some having served a long time in Moorfield's Hospital, London, and in New York City's ophthalmic schools and hospitals. The states of New York, Massachusetts, Pennsylvania, Ohio, West Virginia, Virginia, Mississippi and Kentucky were represented, and also Nova Scotia. When another special term is given in ophthalmology, including rhinology, laryngology and otology, and the term prolonged two weeks or more, the class will be two or three times larger.

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Stanford, Ky. J. G. CARPENTER, M.D.

THE OPHTHALMIC RECORD,

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PAN-AMERICAN MEDICAL CONGRESS.

From a letter received from Dr. C. M. Hobby, Iowa City, Iowa, we learn that he is already exerting himself in the direction of building up the work of the Section of Otology of which he is the Executive President. Any one reading this notice who may have anything new in the line of Otological study should communicate with Dr. Hobby at once, who will arrange with him for the presentation of his thoughts to the Congress.

SECTION OF OPHTHALMOLOGY, A. M. A.

Dr. S. D. Risley, Chairman, and Dr. H. Gradle, Secretary, are now actively engaged in securing papers for the Milwaukee meeting next June If work in that direction counts for anything they will make that meeting one of the best. We would say just two things in this connection: 1st. no man should offer more than one paper; 2nd. every paper should be intended either to establish a new truth or to throw additional light on some old truth. With a score of papers like these from as many writers the meeting will be a most profitable one.

The *Record* speaks now for a synopsis of every paper read, which we trust the author will prepare for us before the meeting. Our own stenographer will be on hand to catch the discussions.

◆

"THE OPHTHALMIC WEEK"

In the Philadelphia Polyclinic was a success, and we regret that we have not a fuller account of the work done than is given in Dr. Carpenter's letter, in this issue. The conception was a new one and will most likely be utilized by other institutions.

We are not sure but that we get from this new plan of the Polyclinic a thought that could be carried into execution in future meetings of the Section of Ophthalmology, A. M. A., and it is this: Let some part of every session be devoted to the exhibition, on the part of some of our men specially skilled in a certain line of thought and work, of methods of examinations and technique of operations. In any city in which the meetings may take place there can be found an abundance of clinical material for this purpose; or the patients could be taken to the meeting from other cities. Who of us would not enjoy seeing Stevens examine a few cases of heterophoria and make as many partial tenotomies? No one would leave the room if Knapp were about to examine a case of cataract so as to determine if it would be justifiable to operate, and then proceed to do the extraction. Michel could make himself felt in a demonstration of his method of developing weak recti muscles. The room would have to be large to hold the lookers-on if it could be announced that Roosa would be present and able to *demonstrate* what he believes to be the *infallibility* of the ophthalmometer.

These suggestions could be continued indeffinitely. We only intended to throw out the thought for what it may be worth.

* * *

THE FORCEPS OPERATION

For the cure of Trachoma is not free from danger to the operator and assistants, since some of the blood, full of micro-organisms, may, by accident, be thrown into their own eyes. Such an accident occured to two well known Oculists a few years ago, while operating on a case At the same moment the material was thrown into the eyes of each. The result is most interesting, and was learned by the writer only a few days ago. The one, believing in the germicidal power of Silver Nitrate, at once expressed a willingness to have a few drops of a 10 grain solution put in each conjunctival sac. As his reward he escaped the development of a case of Trachoma The other, a man well acquainted with germs and germicides, possibly influenced by the pain caused by the instillation in the eyes of his fellow, declined to submit to such a heroic preventive measure. His purnishment was a well-developed case of Trachoma which gave him a great deal of trouble and was not cured for a long time.

This circumstance would not have been known by the writer except for the fact that, while operating a few days ago with a Knapp forceps, a similar accident happened to a young man who was assisting. With our knowledge that Crede's treatment would destroy the germ-life that is capable of developing an Ophthalmia Neonatorum, we reasoned that it might do the same to the Trachoma microbe. With the young man's consent a single drop of a 10 grain solution of nitrate of silver was instilled in the one eye (only one was infected). Great pain followed the instillation and the resulting congestion lasted several hours. He feels safe.

INVERTED IMAGES

On the retina and yet objects are seen erect are conditions not very clearly explained in our works on physiology. Before attempting, by aid of an illustration, to give an easy answer to this question it may not be uninteresting to relate a "before-the-war" incident touching this matter· A rich planter owning his many slaves employed a young physician to give medical and surgical attention to them. Whenever it was necessary for the Doctor to make a visit to the "quarters" the planter would go with him. Testing the young man's capabilities, he plied him with many questions. Always getting a ready response his admiration for, and confidence in, the young Doctor increased.

On one occasion he asked the young man to explain to him how it was that we see objects erect yet know that the images are inverted on the retina. With a readiness that was confidence-inspiring he answered :—"The nerve fibers on leaving the eye and while making their way to the brain become twisted, those from the upper part of the retina thus becoming lowest in the nerve, while those from the lower part of the retina become uppermost in the nerve." The explanation was accepted as true and philosophical ; and the planter was convinced that he had a wise and safe man to look to when sickness seized his negroes.

We are told in works on physiology that we have the same reason for seeing objects erect that we have for locating bodies in space ; and this is true. The accompanying illustration deals only with the inverted image and erect object. Fig. 1 represents a man facing the eye of the observer : *a* of fig. 1 represents his head, *b* his feet and *c* a diamond stud in his shirt front. Fig. 2 represents the eye, *d* the "center of direction" in the posterior part of the crystalline lens, *e* the yellow spot, the most acute part of the retina, *f* a point of the retina vertically above and *g* a point vertically below. All the light coming from the man's head and entering the eye of the observer may be considered as one cone which may be represented by three lines, 1 the central ray of the cone and 2 and 3 the outer rays. The same may be said of his feet and of the diamond stud. The eye is *fixed* on the diamond. The central ray of each of the three cones strike the cornea and lens vertically and are therefore not refracted, and on their way back toward the retina cross one another at the nodal point (the center of direction). The central ray from the stud impinges on the *e*, the yellow spot; the central ray from the head strikes the retina at *g*, and the central ray from the feet come to the retina at *f*. The eye being perfect in its refraction, in obedience to a well known law the outer rays (2 and 3) of each cone are so bent by the refractive media as to be brought to a focus with their respective central ray at *e*, *f* and *g*. Thus an image of the head, likewise of the feet and the diamond, is formed on the retina. What is true of one part of the retina, as to *projection*, must be true

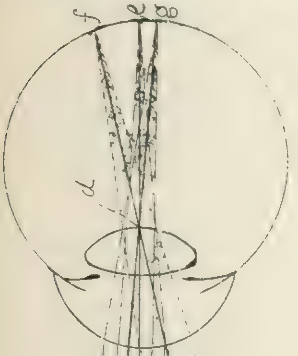

Fig. 2.

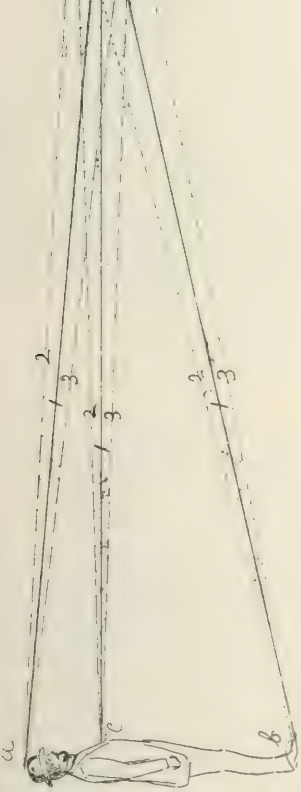

Fig. 1.

of all parts. In the field of vision that object is most distinctly seen which is in the line of the visual axis and consequently throws its image on the yellow spot. The visual axis is a line, vertical to the yellow spot, which on its way out passes through the nodal point *d*. The point of an object seen most acutely is projected on the visual axis. In the illustration the visual axis coincides with 1, the central ray of the cone of light coming from the stud, therefore the mind locates the stud on the central (unrefracted) ray of light that comes from it to the eye. The central ray, 1, from the head is unrefracted, passes through the nodal point and is vertical to the retina at *g*. The image of the head is here. The law of *projection* for this part of the retina is the same as for the yellow spot, therefore the mind locates the head on the central ray of the cone of light coming from it. What is true of the yellow spot and of that part of the retina at *g*, is also true of the retina at *f*. Hence the object is erect though the image is inverted. In the same way the sides of an object are properly located although reversed in the image. The infant being able to direct its visual axes at the object it wishes to see is never troubled in seeing objects other than erect. The power of *projection* might be termed an instinct.

ANATOMY OF CHRONIC INFLAMMATIONS OF THE CONJUNCTIVA.

Having received a letter from Dr. H. D. Noyes calling my attention to a paper by Dr. Jules Mutermilch, on the above subject, which was published in the *Annals D'Oculistique*, we have arranged for the translation of same for the *Record*. Dr. Noyes has pronounced it a most valuable contribution to ophthalmology and it is at his suggestion that the translation will be made. I am sure the readers of the *Record* will appreciate the paper which will most likely appear in the next issue of the *Record*.

THE OPHTHALMIC REVIEW.

The Ophthalmic Review has come out in a new coat and presents a more attractive appearance than ever before. We wish for it a long life and much usefulness.

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SUBCONJUNCTIVAL INJECTIONS OF COCAINE.

We see it suggested that, when an iridectomy is to be made, a small quantity of a 5% solution of cocaine injected beneath the conjunctiva, near the part to be excised, renders the operation painless We shall be glad to know if any of our readers have had any experience on this line. If it will anæsthetize the iris in cataract operations will it do the same when an iridectomy is to be done in a case of glaucoma?

◆

THE COLUMBIAN EXPOSITION.

In a circular letter sent out by Dr. Chas. A. Oliver, Philadelphia, Pa., we read that he has been given charge of the department of clinical demonstration and scientific study of light, form and color. He naturally desires to make this exhibition attractive and profitable. He proposes putting on exhibition any apparatus or contrivance that will demonstrate anything pertaining to his department. Any one reading this who may have invented anything in this line will do well to correspond with Dr. Oliver who will make satisfactory arrangements with him for the exhibition of his apparatus.

PARALYSIS OF THE INFERIOR RECTUS.

A most interesting case of the above named condition is now under our observation. We saw her for the first time yesterday. She came complaining of double vision, except in the upper part of the field. It was not a hard matter to ascertain that the inferior rectus of her left eye was the one affected, and yet because the focal condition of her left eye was better than that of her right, she was using the diseased eye. She was astonished when we told her it was the left, and not the right, eye that was giving her trouble. The interesting part of the history of this case is, that while the doubling occured in the lower half of the field, and even in the lower part of the upper half; there was no leaning of the false image. In looking at a candle held 25 degrees above the horizontal plane, she would see only one candle. As we approached the plane the doubling began and the images became further and further separated the lower the candle was held. The false image was always vertical and always in line with the real candle. This proves that the obliques were thoroughly able to keep the naturally vertical meridian of the cornea of that eye parallel with the corresponding meridian of the right.

Department of Otology, Laryngology and Rhinology.

Geo. H. Price, m. d., Editor, 621½ Church Street,
NASHVILLE, TENN.

RECENT METHODS OF OPENING THE MASTOID ANTRUM.

By WILLIAM ROBERTSON, M.D.,
Surgeon, Throat and Ear Hospital, Newcastle-on-Tyne.

In spite of all that has been said for the efficacy of excision of the drum-head and ossicles in the treatment of chronic otorrhœa, a very large percentage of operators have found it fail in its desired end. From a consideration of the conditions to be expected in chronic otitis media purulenta, such a result might very readily have been anticipated, more especially if the inflammatory process has existed in the tympanum for any length of time, and has proved rebellious to routine measures of treatment. In such cases the mastoid antrum has almost to a certainty become involved, and is perpetuating and propagating the mischief in the middle ear, as well as enlarging its own limits. Practical results prove that under these circumstances mere excisions of the drum head and ossicles falls very far short of effecting anything beyond an improvement strictly confined to the close neighbourhood of their site at the most, and even this is but temporary, soon giving place to the former state. Purulent irritating discharges, elaborated in the antrum, course over the tympanic mucosa, and escape by the meatus should egress in this way be open. But if through swelling of the mucous membrane or any other obstacle (inspissated *débris*, etc.) the passage from the antrum into the tympanum is obstructed, then the pent-up products may point in other directions, *e.g.*, towards the dura mater or outwards into the mastoid cells, if such exist. Obviously, in view of such contingencies the mere excision of the drum-head and ossicles falls very far short of the operative requirements demanded.

In any given case of chronic otorrhœa, if the symptoms of vertigo, deep-seated pain in the ear, and perhaps occasional vomiting be present, with, besides, the condition of deep injection of the tissues at the inner end of the meatus, together with discharge, etc., then it may be accepted that irritation of the dura mater is being caused by pent-up products in the antrum pointing in that direction, even though the mastoid shows externally no sign. To meet the requirements of such a case, nothing short of opening and draining the antrum will suffice. The mere fact that in many of these cases there is no sign of danger displayed externally over the mastoid area has, it is to be feared, often led to a disregard of the dangers indicated. If it were more widely appreciated that in a very large proportion of such cases the external wall of the antrum is composed of dense bone quite up to the limits of the space, and thus forms an insuperable obstacle to escape of discharge in this way, and in consequence throws its tendency to escape in the way of highly vulnerable structures, then the propriety of early operations would be more freely acted upon. How to open the antrum without risk, and at the same time effect adequate drainage, becomes a question of the first importance.

In more than one respect can exception be taken to Schwartze's method of operating. In the cases to which we more particularly refer there are no sinuses opening externally, which may be safely followed up to the antrum. To proceed to operate according to Schwartze's method there is absolutely no certainty that during the procedure the sigmoid sinus will not be injured, no matter how carefully it is conducted. Clinical records of the operation abound with notes—*e.g.*, that after section of the depth of two centimètres the chisel or gouge was laid aside; that at the time of the operation there was no communication between the wound and the antrum effected, etc.; all such remarks and occurrences going to prove that even in the most carefully planned operations unsuccessful results frequently do occur. Then, after all, does such perforation when effected adequately drain the cavity? The rather large number of relapses after the operation, and when due time has been given for repair, would seem to indicate failure. The bridge of bone left between the section and the meatus is no doubt inimical to perfect drainage, while this part of bone itself may often be diseased at its inner end, and thus account for failure.

Two results desired to be effected—either to thoroughly open up the antrum, and then by keeping it open to endeavour to encourage granulation tissue growth, and thus abolish the cavity; or again to lay its cavity freely open externally, and with the tympanum, so that one large cavity is established—are kept in view in modern treatment. Neither result can be hoped for from Schwartze's method of operating. Attention is now being attracted to more recent methods of operating, from which results as above may be expected. Such an operation may be described as follows:—

An elliptical incision is made in the line of junction of the auricle with the mastoid down to the bone. The auricle is now forcibly dragged forward with retractors, and a raspatory is used to lift the posterior (cutaneous) wall of the meatus well forward from the bone. The tissues over the mastoid are now freed and lifted posteriorly as far as may be. A bent probe is now used to find out the entrance to the mastoid antrum and realize its direction and extent. This is effected by passing the bent end of the probe along the posterior meatal wall until the bent portion of the probe sinks into the opening of the antrum. By pulling on the probe it is now felt caught in the cavity. Leaving this *in situ*, or in the hands of an assistant, with mallet and chisel, the whole area of the mastoid wall limiting the space (including, of course, the posterior osseous meatus) is chiselled off, following throughout the process the indications given by the probe in the antrum. The delicate part of the operation occurs at the section of the posterior part of the ring of bone in which the membrana tympani is fixed. The presence of the probe in the antrum, however, prevents injury to the semicircular canal lodged in the inner wall of the tympanum. A pair of suitable bone forceps might be used to cut at this depth, could such be made as delicate and at the same time as strong as necessary. Once the cavity is freely opened, any overhanging ridges of bone can be snipped off. If it is desirable to more freely open up the attic of the tympanum, the soft parts must be pushed aside, and the bone removed. Carious ossicles, etc., can now be removed. Too low section of the posterior osseous wall of the meatus must be avoided, in order that the facial nerve here lodged in its canal may escape injury. Following out the dimensions of the antrum as indicated by the probe, and abiding by this, any such accident is avoidable. Now that all the bone is cleared away, the curette is used to remove all granulations, *débris*, etc., from antrum and tympanum.

A longitudinal section of the posterior wall of the soft meatus throughout its length is now made, and also an effort to fold the flaps on to the bone. The antrum is then lightly plugged with iodoform gauze, and a strip placed in the meatus.

The great safety of this method of operating turns upon the use of the searcher placed in the mastoid antrum, an innovation introduced by Victor Horsley. The great bugbear to operating in the usual way, viz., injury to the sigmoid sinus, is entirely escaped. The cavity cannot possibly be missed, and the searcher *in situ* prevents injury to the facial nerve and semicircular canals, etc., while after the antrum is reached and opened up by the subsequent use of gouge forceps, any remaining diseased structure can be snipped off.

Results: For one thing the external inflammatory œdema, if attendant on the case, much more quickly disappears than after the old operation.

Again, freer drainage being present, the intra-tympanic condition sooner subsides, and with this earlier return of hearing. A speedy disappearance of dural irritation is marked when this is a feature of the case. The operation has proved effective where excision of the drum-head and ossicles has proved abortive.

Subsequent dressing of the wound produced is much less painful, and the course of the case shorter.—*From The Journal of Laryngology, Rhinology and Otology.*

THE

OPHTHALMIC RECORD.

VOL. II. MARCH, 1893. No. 9.

THE PATHOLOGICAL ANATOMY OF CHRONIC INFLAMMATIONS OF THE CONJUNCTIVA.

BY JULES MUTERMILCH,

Translated from Annales D'Oculisteque, for the Ophthalmic Record by

M. F. WEYMANN, M.D.,

ST. JOSEPH, MO.

The investigations concerning chronic inflammations of the conjunctiva present a chaos in a surprising degree in contradiction with the precision characterizing ophthalmology. Even a superficial study of this important part of ophthalmological pathology suffices to convince us that the absence of a rational classification, the illogical and unscientific definitions of certain morbid types, and the diversity of opinion on the subject of the so-called trachomatous condition are nothing but the natural consequence of the insufficiency of anatomical research concerning this question.

The pathological anatomy of inflammatory affections of the conjunctiva has been the subject of a great many investigations.

The work of Raehlmann, doubtless, is the most complete, but that author, as all the rest, made the serious mistake of carrying out his anatomical researches without uniting them with precise clinical observations.

The anatomist certainly does not understand well a microscopical preparation, unless he knows exactly the clinical signs accompanying the modifications which the tissue under examination has undergone.

On the other hand, the clinician only renders account to himself, those of the signs observed in his patient which concord in his mind with corresponding anatomical appearances.

With this principle in view I have concluded to follow the enumerated rules in my researches.

1. To observe only patients who have never been treated or, at least, who have discontinued treatment a sufficiently long period. I have considered this condition as a necessary one, for this simple reason that all treatment, especially, as may happen, a badly chosen treatment, does not alone modify the macroscopic aspect of the tissue, but possibly also their anatomical characters.

2. To note all macroscopic alterations that the observer can perceive about the conjunctiva together with the objective and subjective state of the patient.

3. To direct, in all cases, attention to the cornea, concerning the kind and the location of pannus.

4. To excise small particles of tissue necessary for microscopic examination, always from the same portion of the conjunctiva, either from the surface of the cul-de-sacs or, perhaps, at the border of the tarsal cartilages and the cul-de-sacs.

5. To have in view, in every particular case, the mode of treatment.

6. To submit the patient to careful observation as long as possible.

At the moment the patient's condition improved perceptibly, I suspended the treatment and, after some days of rest, I examined microscopically a second portion of conjunctiva excised from the part immediately adjacent to the preceding excision (the first excision, followed by a microscopic examination, took place always at the beginning of the treatment).

Before this little operation I carefully noted all alterations which had occurred on the conjunctiva and the cornea since the treatment had been instituted. Proceeding in this manner I obtained a series of numerous anatomical and various clinical facts, whose study and attentive comparison enabled me to appreciate easily the value of every material change in the course of the disease. Besides, it became easy for me to distinguish constant and typical alterations occurring in all cases from those which were accidental and of less importance. I endeavored principally to find the pathognomonic pathological characters, i. e., those which manifested themselves, and disappeared, at the same time as the principal clinical signs, and re-occurred in every particular case and developed in direct relation with the intensity of the morbid process.

The result of my investigations is that the * "follicles" do not belong, by any means, to this kind of anatomical signs. Those productions have almost no importance in the pathology of the conjunctiva and it is only through superficial and unsystematic researches that they have been brought to prime importance.

It is Dr. Kramsztyk who first made a serious attack on the follicular theory. In his work about the relation between trachoma and pannus that author has proven that pannus, that serious complication of trachoma, was in no way in connection with the macroscopic aspect of the conjunctiva. Pannus is, without a doubt, the expression of a slow phase of the morbid process having for its seat the palpebral conjunctiva; hence, if the production of follicles and papillæ were the essential fact in the material alterations of the conjunctiva, we should expect to see a direct relation between the extent and the density of pannus on the one hand and between the degree of development of those pathological formations on the other. Now, according to Kramsztyk, no such thing occurs. Basing his view on numer-

Remark: The term follicle is here used as a synonym for granulation, granulation body, trachoma body, trachoma kernel, granulation follicle, trachomatous follicle. It is taken from the pathological teaching, adhered to even now by many able pathologists, that a granulation is merely a distended lymphoid follicle of the conjunctiva. The fact that such a granulation is a spheroidal mass of lymph-cells surrounded by a capsule showing, in many cases, delicate fibres passing radially to the center makes them anatomically equal to a regular lymph follicle.

TRANSLATOR.

ous observations, that clinician rejects completely this relation, and my microscopic examinations only confirm his opinion.

The only constant anatomo-pathological phenomenon accompanying all chronic inflammations of the conjunctiva and being, at the same time, the cause of the production of pannus, the only characteristic sign which can serve as a starting point of a rational classification, is the alteration of the epithelium.

The changes producing themselves in that important part of the conjunctiva are so interesting and manifest themselves with such a precision that it is really difficult to explain why the many authors who have examined into the pathological anatomy of the conjunctiva have given them so little attention. Microscopic preparations, which represent different stages of chronic conjunctivitis, offer a beautiful example of the struggle for existence which the epithelial cells have to undergo. We can follow in such preparations, step by step, the various phases of that struggle: the moment when these little cells, threatened in their existence, begin to proliferate energetically and so increase their forces necessary for the defense; the moment of defeat, when the places occupied so far by the epithelium become deserted and are covered with the rest of the conquered cells, while the elements having escaped the disaster retire from the battle-field into the depth of the tissues, awaiting there more favorable circumstances for their return to the surface of the conjunctiva and, finally, we witness the victory of the epithelial elements, the vigorous multiplication of the cells and see them moving back again into the places temporarily abandoned.

There exists a constant relation between clinical manifestations and the appearance of the epithelium. Every form, or rather every phase of a chronic conjunctivitis, is always accompanied by the same pathological process in the epithelium. With a little practice, one becomes enabled to read easily on the microscopic preparation the actual subjective and objective state of the patient, and vice versa.

Before giving a detailed description of the changes in the epithelium, I consider it useful to say a few words about its normal appearance.

We find any number of different opinions, in science, about the epithelium of the palpebral conjunctiva in its normal state. All varieties are here represented except that which really exists. We easily understand this diversity of erroneous opinions, if we remember how difficult it is to observe a conjunctiva of which the physician can say with certainty that it is absolutely normal and has never been diseased. We are often consulted by patients complaining of typical phenomena which leave no doubt as to the existence of a conjunctival catarrh and still the conjunctiva on inspection looks perfectly healthy ; and, on the contrary, we can observe individuals who believe themselves absolutely well in spite of a certain redness of the conjunctiva, the latter being slightly swollen and covered with small papillæ or even follicles.

On the other hand, changes following light forms of inflammation disappear on the cadaver, the desquammation of the epithelium coming on so rapidly. All this only increases the difficulty to obtain, in *this* manner of anatomical examination, a normal epithelium.

The cases in which we can use the conjunctiva of an absolutely healthy person are, as we can readily imagine, very exceptional. I have, therefore, first taken up the study of the conjunctiva of the rabbit, then, having had occasion to examine also the conjunctiva of the superior and inferior cul-de-sacs of a 16 year old boy, perfectly healthy, I noted that the result of those examinations enabled me to identify completely the two mucosæ.

On the surface of the cul-de-sac the epithelium is composed of three or four layers. The superficial layer contains almost exclusively mucous "corpuscles," fairly large, which in their appearance approach goblet cells. They are round or oval, slightly elongated in the horizontal direction, less frequently conical. The outlines of these corpuscles are quite sharp, their protaplasm finely granular : their nuclei are eccentric being closer to the deeper border. In the second layer the mucous-cells are less abundant. Near these latter elements we find round epithelial cells whose protoplasm forms a narrow ring around the nucleus ; these are the young elements which give birth to the mucous cells : it is not difficult to observe intermediate forms among them all. The intermediate cells which fill the interstices between the mucous corpuscles of the superficial layer appear in form of triangles in a section. One of these angles, less acute than the others and containing the nucleus is turned towards the depth of the tissue. The other layers, more deeply situated, contain almost exclusively young cells. One notices sometimes narrow fissures in the epithlium which are rather long and parallel to the surface of the conjunctiva; they are filled with grains of different size These vacuoles result probably from the rapid destruction of a certain number of mucous cells or are due perhaps to a retarded development of young elements.

In the prolongations which the epithelium sends into the subjacent tissue and which I have seen only in the upper lid, the cells arrange themselves most usually in two layers of which the inner is composed of cylindrical cells, the outer of round cells. Immediately beneath the epithelium there is adenoid tissue composed of loose cellular tissue infiltrated with leucocytes. In the rabbit the conjunctival epithelium presents the same structure.

I. At the beginning of a chronic conjunctivitis, when we have to deal with the so-called catarrhal forms, but when the cornea is still perfectly sound and not even threatened, the conjunctiva is slightly reddened and only presents a few transparent follicles (principally on the lower lid) and the epithelium differs very little from its usual appearances. The difference lies in the circumstance that the mucous corpuscles develop with a greater energy than in the normal state, but the rapid development of these elements and the increase in their function, namely the production of mucous, brings about their destruction before they reach their full maturity Most of them have a conical form. The elongated extremity contains the nucleus and inserts itself between two cells of deeper situation. They are usually smaller and approach in their appearance the intermediate forms. The young epithelial cells, likewise, multiply and come to the surface of the conjunctiva, to the points where the row of mucous cells is broken. It goes without saying that the thin layer of normal epithelium, in consequence of the more active proliferation, thickens and becomes more marked on a transverse section of the conjunctiva.

Ordinarily we find in the sub-epithelial tissue a certain degree of infiltration, diffuse, or disposed in form of follicles.

The leucocytes penetrate between the epithelial elements: in some places they are quite numerous. If one wanted to judge about the clinical condition of the patient with reference to the changes observed in the sub-epithelial tissue, one would readily fall into an error by taking this light and first degree of inflammation for a serious form. It is sufficient for the correct appreciation of the character of this disease, to examine more carefully the epithelium and then it will be noticed that it forms on the conjunctival surface an almost uniform and continuous layer and, what deserves particular attention, that it preserves its character, its normal type.

Restitutio ad integrum of the epithelium is, in this case, possible, as we know from clinical observation. We can expect it, considering the slight change of the elements.

II. When there exist conditions favoring the progressive march of the pathological process, the round cells become incapable of transforming themselves into mucous cells. In place of the layer represented by the mucous cells we find elements which have no determined form, they do not stain and do not contain nuclei, or else we see there a considerable quantity of granules more or less voluminous; all this represents nothing but the rests of degenerated mucous cells. The other elements are little modified, their nuclei are slightly swelled and take up less coloring matter.

Occasionally the follicles are so abundant in this phase of inflammation, that they are almost run together in one mass in which it is difficult to distinguish the outlines of the individual follicle. The leucocytes are found in large quantity in the epithelial layer, whence they penetrate into the conjunctival sac. The clinical manifestations of this morbid form, characterized principally by the destruction of the superficial layer of the epithelium, notably of the mucous cells, are not many. The cornea stays intact, in spite of the crowded follicles on the conjunctiva. Suppuration is little marked, the patient complains of no suffering and often does not even consult the physician until the conjunctiva, thickened by infiltration, has caused a narrowing of the palpebral fissure (ptosis). Strictly speaking, it is an intermediate phase uniting in one evolutional stage the most simple catarrhal inflammations as well as the different forms of trachoma.

III. We must look for the most essential modifications of the epithelium in those forms of chronic conjunctivitis, which often last for years and are complicated as a rule by pannus (trachoma folliculare, mixture, papillare, infiltratio trachomatosa). Here the follicles occur more or less abundantly, sometimes gross appearances do not show any; sometimes even, as I have seen, a certain number of cases which every physician would certainly take for the most serious forms of trachoma (duration of the disease, pannus sarcomatosus), do not present one follicle in the preparations taken from the surface of the cul-de-sac and the tarsus. It is possible that those productions *had* existed at the beginning of the affection and that they had disappeared little by little either by absorption or in some other manner. However that may be, the fact that the disease may progress without the presence of follicles destroys their pathognomonic value.

Their abundant accumulation on the conjunctiva, (which we must not consider as a peculiar variety of inflammatory infiltration, but as a secondary and not primary manifestation), exercises, no doubt, an injurious influence on the neighboring tissues, probably determining circulatory disturbances and thickening of the conjunctiva. We here encounter a phenomenon of comparative frequency in the organism, i. e. the reaction, coming to defend an organ or a threatened tissue, passes over the necessary limits and, perhaps, becomes injurious by giving rise, as in this case, to an exuberant and exaggerated growth. Still there does exist a certain relation between the quantity of follicles and the phase of inflammatory action, namely a relation exactly opposed to that which has been admitted up to this time.

This relation reads thus: the more the disease progresses and the more it is liable to (aggravations) exacerbations, the smaller is the number of follicles. This can be explained by the fact that inflammatory infiltration in loose cellular tissue most frequently takes a spherical form (acts in spherical foci). Repeated and long exacerbations, a frequent thing in chronic conjunctivitis, render the tissue denser, consequently less favorable for the production of follicles. In all those grave forms of trachoma it is only in the epithelium where we find constant changes developing in the upper layer and localizing in the layer of round cells.

The mucous cells, as we have just remarked, are destroyed first. According to the intensity of the respective affection, the etiological factors and individual properties of the tissue, or the hygienic conditions, the destruction of the cells progresses more or less rapidly and finally ends by a complete disappearance of the conjunctival epithelium. This process takes place progressively and does not invade the whole extent of the conjunctiva at the same time. In places we may still find a pretty thick layer of larger cells, which appear almost as one mass, owing to their indistinct outline and hyaline protoplasm. Some of these cells do not contain any nucleus at all, in others they stain very lightly. This epithelium often presents more or less extensive vacuoles filled with granules or leucocytes. The surface of the conjunctiva appears in certain places entirely deprived of epithelium, still a more careful examination easily allows us to prove in the mass of leucocytes epithelial cells elongated in the horizontal direction, producing the effect of corneous cells containing no nuclei and accepting no stain. In certain spots where the layer of these elements is a little thicker, the observer can find some cells which have not undergone a complete degeneration and are prominent (perceptible), owing to their ability of absorbing stains. As the disease goes on, the epithelium disappears more and more, and finally there remains only a thin "lacuelle" in the conjunctival surface with very distinct outlines coming from the fusion of degenerated elements.

The epithelial prolongations, which in their structure resemble tubular glands are formed in considerable quantities in a conjunctiva affected with a chronic inflammation, and penetrate deeper into the tissue than in the normal state. Their form and dimensions differ. Sometimes they unite and form complicated figures. Some of those pseudo-glands possess no lumen, while in others it may assume considerable dimensions.

The deep part of those prolongations is usually the larger, which gives them the form of balloons or a resemblance to the neck of a bottle. The enlarged extremity may be closed off and transformed into a sort of cyst, which fills itself with desquamated cells, having undergone fatty degeneration, and then they may increase in size until they become visible on a section to the bare eye. When the cells of the superficial layer are completely destroyed those of the prolongations begin to change, but *the pathological process only touches the cells nearest to the conjunctival surface, those of deeper location remaining normal during the whole course of the disease.*

What is it that causes the epithelium to bury itself in the sub-mucous tissue in form of those numerous prolongations, and why is it that the cells remain normal only in the final (terminal) ramifications, even in the most severe forms of inflammation?

The advocates of the follicular theory of trachoma cannot give a satisfactory answer to those questions. These facts prove in an indisputable manner that the epithelial layer covering the conjunctiva plays an important role in inflammatory affections and that it is that part which is the most important, if not the only, seat of the disease. The more distant the cells are from the conjunctival surface, the less they are threatened, the more chance they have to retain their normal characters and thus to form the source which, sooner or later, in favorable circumstances will give rise to a new epithelial lining covering the denuded conjunctiva. Another proof in favor of the epithelial theory is furnished us by the formation of papillæ, which is a significant manifestation of the resistance of the cells and their very active proliferation. These papillæ are formed by the prolongations which the epithelium sends downward, a fact easily verified on microscopic sections. The epithelial cells which cover the papillæ undergo all the progressive transformations which I have described above and which here, as elsewhere, correspond to the intensity of the disease.

Hence, according to constant and characteristic alterations which we observe in the epithelium, we can divide the chronic inflammations of the conjunctiva into three groups.

The first comprises the catarrhal forms, where the function of the cells with reference to multiplication and the production of mucous is considerably increased.

The second category is made up by the forms characterized by the destruction of mucous elements.

To the third there belong the grave inflammations which, although fairly well held apart by macroscopic signs, are easily grouped under one head, owing to one characteristic common to them: it is the complete, or nearly complete, destruction of all epithelial elements on the surface of the conjunctiva and the manner in which these same elements behave in the depth of the tissue.

We do not have here a classification in the true sense of the word, for all those forms are derived by successive development from one another: in certain cases we can observe the simultaneous existence of different forms, because the pathological process does not invade the whole conjunctival surface at the same time. Moreover, even clinical observation shows us that several individuals (for instance several members of the same family who were infected by the same morbid agent) do not always present the same changes in their conjunctivæ, a fact which explains the different resistance of the tissues.

We must distinguish among the chronic conjunctivitides not only the separate forms, but also the phases of one and the same disease.

1. Stage of proliferation.
2. Stage of superficial destruction.
3. Stage of total destruction.

It is difficult to point out the clinical signs which distinguish the first stage from the second, with the exception of a quantitative difference in the macroscopic aspect. *The beginning of the third stage is typical, it shows itself mainly by a serious complication on the part of the cornea, namely pannus,* which increases as the destruction of the epithelium goes on. It occupies the upper half of the cornea, if it is only the upper lid affected by the disease, and it extends over the whole cornea if both lids are diseased.

The constant subordination of the condition of the cornea to that of the epithelium of the conjunctival surface is a very important fact which explains to us certain obscure and incomprehensible phenomena often observed in treating patients affected with trachoma. Thus we readily understand why pannus of the cornea is not in direct proportion with the gross changes in the conjunctiva, assuming sometimes a very serious character (pannus crassus) when the conjunctiva only shows a small number of follicles and papillæ or even offers a perfectly smooth surface, and on the other hand, retaining a surprising mildness (pannus tennis) in spite of considerable macroscopic alterations of the conjunctiva. We understand also why, if we limit ourselves only to the conjunctiva, the pannus begins to disappear before the apparent resorption of the follicles and the diminution of the size of the papillæ and finally why the actual methods of treatment of trachoma complicated by pannus are in the end very efficaceous which, *a priori*, might appear contrary to the accepted principles of therapeutics. *

Under favorable circumstances the regeneration of the epithelium takes place rapidly, even when we have to deal with considerable anatomical changes. Hygiene is a powerful ally of the physician in the warfare against the destructive process of the epithelium. I have known many patients belonging to the poor class in whom the reproduction of the epithelium went on very slowly as long as they were treated in the out-door department of the hospital; the same remedies employed in these persons during their stay in the hospital produced rapid improvement. We can easily understand how the return of the epithelium is brought about if we remember that the solution of argentic nitrate, sulphate of copper and other medicaments hasten the mortification and the dropping off of the superficial layers. We thus approach, little by little, the epithelial cells imprisoned in the depth of the tissue, where they have not lost their physiological properties and are ready to take a favorable surface prepared for them.

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* It is the rule in therapy to remove the cause of the disease, or its manifestations, when the first condition is unrealized. Thus it might be surprising that the physician obtains the best results by cauterizing lightly the conjdnctival surface, which is without significance to the follicles and papillæ (so-called cause of the affection) and cannot have any action directly on the pannus, which is the most serious manifestation of the disease.

After the destruction of the diseased layers by means of the proper and moderate application of our therapeutic means we excite the proliferative faculties of the epithelial cells which rapidly re-cover the conjunctiva, and that with a thicker epithelium than in the normal state. *At this new phase of the disease (stage of regeneration) the pannus begins to disappear.* The type of epithelium at this stage is variable and depends on former condition of the conjunctiva. If the destruction was superficial only, the regenerated epithelium is composed of several layers of cells (6 to 7) which resemble the mucous cells, reminding us of the incompletely developed elements observed in chronic catarrh. The more advanced the destruction and the longer the duration of the pathological process, the more pronounced becomes the epidermoidal character of the new epithelium. The superficial cells assume a flattened form, the deeper come more and more into resemblance with the cylindrical form. The final result of the epithelial metamorphosis is the epidermoidal form, characterized by an almost general transformation of the cells into the corneous type except the deep or fundamental cells, which remain cylindrical.

When the regeneration is little active, only a thin film of epithelial cells is formed which are subject to a repeated degeneration, thus producing vacuoles. If, during treatment, the patient remains long under unfavorable circumstances the degenerated epithelial cells are lost in the mass and the conjunctival surface becomes then covered with a mass almost fibrous, in which sometimes the observer cannot recognize the outlines of the elements.

Along with those important changes in the epithelium there occurs a series of phenomena of secondary value, but great theoretical interest, namely the formation and disappearance of follicles and papillæ, the new formation of lymphatic vessels, the production of conjunctival cicatrices, the modifications occurring in the glands, and finally trichiasis.

FORMATION, DEVELOPMENT, DISAPPEARANCE AND REGENERATION OF THE FOLLICLES.

In the examination of the follicles I did not only consider the study of their form and their intimate structure, but I also endeavored to account for the question by far more important, "how and why are those strange productions formed?" In order to solve these interesting questions, it seemed insufficient to me to study only the chronic conjunctivitides: consequently I also took up the acute forms, trying in this manner to understand the first moments of the existence of the follicles, in order to follow, subsequently, their progressive development. I have attached the results obtained in this manner to those of the anatomical examination of chronic forms, hoping that this combined method would allow me to secure a satisfactory answer to the questions which occupied my mind.

Whenever under the influence of morbid agents, most frequently those of parasitic origin, the conjunctival epithelium begins to undergo characteristic inflammatory changes, there manifests itself immediately on the part of the organism a defensive reaction, which shows itself by the migration of white blood cells into the sub-epithelial tissue.

The microscopic examination of the conjunctiva during the first days (2 to 4) of the acute inflammation allows us to see how the white blood cells leave the small sub-epithelial vessels and how they crowd around each other in quantities more or less considerable in order to pass subsequently toward the epithelium being threatened in their existence; at the end of several days they form underneath the epithelium a layer of inflammatory infiltration. Between this layer, on the one hand, and the larger vessels forming a net work relatively far from the epthelium, on the other, the cellular tissue remains little infiltrated: the white cells only pass through it, without stopping, in order to reach the conjunctival surface. These elements pass in considerable quantity into the interstices of the epithelial cells, whence they are soon eliminated into the conjuntivalsæ.

What is the role which this army of white cells so well organized accomplishes? The circumstances favoring their emmigration, often of a purely mechanical nature, prove that function is not alone limited to phagocytism: the white cells probably also absorb the products of regressive tissue metamorphosis and then, being destroyed, in their turn, furnish nutrition to the diseased tissues. At all events, it is not doubtful that the white cells fulfill in the inflammed tissue an important and complicated mission, which exhausts their vital forces and it is for that reason that a certain number of them die before being eliminated outward or before re-entering the circulation.

An attentive examination of the mass of cells making up the inflammatory infiltration allows us to notice that all cells do not stain alike. Cells which absorb less coloring matter, or none at all, are often larger and do not possess a well-limited nucleus: Those are, without a doubt, elements already attached in a certain measure by the degenerative process and, consequently, unable to carry out their amœboid movements. The quantity of cells having left the vessels and the extent of the strip of inflammatory infiltration is proportional to the intensity and the duration of the inflammation. The elements situated at the periphery of infiltration absorb more readily the oxygen necessary for their life and movements from the neighboring tissues and it is for that reason that they retain their normal characters for a longer time. The white cells near the center are in less favorable conditions and, therefore, undergo degeneration more rapidly.

The circumstances which especially influence the vitality of the lymphatic cells are certain general properties of the organism and the hygienic conditions under which the sick person exists.

In the so-called lymphatic subjects, as well as in those whose organism is exhausted by certain constitutional diseases or insufficient nutrition, the oxydation of the tissues is very poor; as a result the vitality of the white cells is quite feeble and they rapidly loose their amœboid movements, when once they have left the vessels. Nor is there anything astonishing in this, because we know that these movements take place only in tisssue supplied abundantly with oxygen. In those cases where for one reason or another the organism finds itself in unfavorable circumstances a large quantity of lymphatic cells undergoes changes and then, by reason of the inflammatory infiltration there are formed islands composed of these degenerate elements. *The grouping of white cells in foci is favored by the structure of the loose cellular tissue, adenoid in nature, and situated beneath the epithelial layer.*

In the meshes of this tissue we find, even in the normal state, lymphatic cells in pretty large quantities.

The isolated degenerated cells, or rather their islands of small dimensions, undergo easily regressive metamorphosis or absorption, and after the extinction of the inflammatory process we no longer can find a trace of them in the tissues.

But, when owing to conditions mentioned heretofore, the degenerated cells are more numerous and give place to larger foci, it is evident that rapid absorption can no longer take place. The cells swell and run together into an almost uniform mass, well marked off from the neighboring tissues. Thus the first nuclei of future follicles are formed. In following these nuclei further along we see that they always behave in the same manner toward the surrounding tissues and that they are subject to typical and constant metamorphoses, which may be divided into two phases; the first comprises a series of phenomena, positive phenomena so to speak, giving to the nuclei the characteristic appearances of developed follicles; the second presents a regressive, negative character, determining the disappearance of these productions. If we remember the experiment of Ranvier (Traité techniqued' histologie), with a piece of marrow of elderbush introduced under the skin of a frog, proving that the lymphatic cells easily traverse a spongy body, we can indeed understand *à priori* how a small group of degenerated leucocytes transforms itself into a typical follicle. The normal white cells lying at the periphery of the follicular nucleus situ can easily pass into its center; in that case they behave as they would toward a foreign body whose consistency does not offer any obstacle to their amœboid movement. We observe exactly the same thing in the conjunctiva, and, besides, the lymphatic cells share with the follicular nucleus the same relation as we observe between the white cells and the elder-marrow spoken of: that is, in the peripheral parts of the nucleus we see an accumulation in large quantities of normal cells. The more we approach the center, the fewer the normal elements, since these must of necessity die there on account of the insufficient supply of oxygen, or its complete absence. The islands of degenerated elements or follicular nuclei do not always offer the same appearance; their volumes as well as their forms are variable, the borders are always poorly marked. These differences are evidently in proportion with the quantity of degenerated lymphatic cells, that is, with the general condition of the patient and the amount of inflammatory infiltration. We can easily distinguish these productions in the mass of lymphatic cells owing to the fact that they are exclusively composed of degenerated elements and consequently take up less stain than the others. The follicular nuclei become more apparent whenever they are on the way of transformation to the fully formed follicles, because then the peripheral layers stain in a more pronounced manner than the center and are composed of cells crowded more densely against each other.

We then find them in the midst of adenoid tissue more or less approaching the epithelial layer and under a weak magnification (oc. 3, obj. AA Leitz). They produce the effect of small patches well marked off on the ground of inflammatory infiltration. A stronger magnification (oc. 3, obj. DD Leitz) shows more distinctly that the center of every patch contains almost nothing but degenerated elements differing considerably in their size and in the staining of peripheral elements. The nucles of these productions becomes more and more considerable and, as these cells are invaded by the degenerative process, it is transformed into a uniform mass, almost half fluid, and approaches more and more the spherical form, owing to the equal pressure exerted from all sides by the surrounding tissues.

Hence the individual characters of the organism, the special attitude of the lymphatic cells in their relation to a foreign body of certain consistency, and finally, the anatomical structure of the sub-epithelial adenoid tissue, represent the only conditions favoring *the production of follicles in all inflammations of the conjunctiva.* A follicle stained with hæmatoxyline takes a characteristic appearance, since its peripheral parts, containing a lot of normal cells, are stained more distinctly than the central parts composed principally of degenerated elements. Still, as we shall see further on, this appearance changes as the follicle passes from one phase of its existence to another.

When the morbid process, having attacked the epithelium, begins to diminish, the quantity of white cells eliminated from the vessels into the tissues also becomes less, dwindling down to a minium at the moment when the inflammation disappears. The migration of the leucocytes does not cease completely, since it takes place to a certain degree even in the normal state. The white cells which have retained their amœboid movements are taken up by the lymphatic passages and thus returned into the circulation: the isolated degenerated elements are also removed, being easily absorbed and, finally, nothing remains in the sub-epithelial tissue but the islands of degenerated cells, as last trace of the extinct inflammation, forming with the normal elements, which are detained principally around the peripherial layers, what is wrongly called a follicle. These productions have nothing in common with the true lymphatic follicles, neither in respect to their origin nor their structure. When the resistence of the white cells is very small, the quantity of follicles may be so considerable that they almost fill completely the sub-epithelial tissue and are then fused into an almost continuous chain. The growth of the follicles is influenced in the following manner by the exacerbations of the disease which gave birth to them: the elements situated at the periphery undergo in the course of time the same regressive metamorphoses as those of the nucleus, with which finally they become fused. At the same time new normal lymphatic cells are heaped up around the nucleus and undergo, in their turn, degeneration for reasons easily understood, and so on. Still we easily understand that the dimensions of the follicle cannot pass beyond certain limits: the reasons are as follows: When a follicle, which always takes origin in the adenoid tissue situated immediately under the epithelium, reaches the deep layers of the conjunctiva, it finds there a serious obstacle to its growth. The sub-jacent tissue is more compact owing to the abundance of bundles of connective tissue crossing in all directions and thus forming a close net-work. Now, this mesh-work is little favorable to the development of the follicles for it yields very little to the pressure exerted upon it and that not even without a distinct re-action. The connective fibres of the tissue in question, irritated by the follicles, insert themselves between them and pass through a whole series of transformations; they thicken, become fused, and finish in sclerosis.

These phenomena are observed everywhere in the fibers nearest to the follicle and result in the production of a sort of hyaline cupule, distinctly marked off and surrounding the follicle on the side towards the skin. Consequently, a barrier is formed at this place arresting the new elements in their migration so they can no longer come to join the follicle, the latter ceasing to grow in that direction. Stained with hæmatoxyline it takes an appearance distinctly different from those follicles which do not stay in the tissue so long and have not yet reached the deeper parts of the more compact connective tissue.

In these latter forms normal elements surround the whole periphery and form a complete ring, staining more heavily.

On the other hand the section of an older follicle offers a crescent of normal lymphatic cells embracing the nucleus on the side of the epithelium. Not finding any obstacle to its development in the direction of the epithelium, the follicle approaches more and more the conjutival surface and, as result, a progressive atrophy of the epithelial cells covering it takes place; thus toward the end, the least traumatism is suffieient to rupture the epithelial layer and a part of the follicular contents having undergone almost complete liquefaction, may escape outward. That the follicle can never empty itself entirely in this spontaneous manner I know from miscroscopic examination. The following observation proves it in an incontestable way.

In a case of chronic follicular conjunctivitis the conjunctiva was crowded with follicles, running together in places. They were squeezed out by means of the forceps by Dr. Kramsztyk. *A priori*, we expected an absolutely favorable result from this method, and it was thought that not even a trace of follicles would remain in the conjunctiva. Now, at the end of two weeks, in spite of a completely smooth appearance of the conjunctival surface, the microscopical examination showed a quantity of follicles not less than before. Although smaller than those before, they nevertheless existed for a long time in the tissue. The presence of connective tissue in their inner layers was evidence of it. Hence, we see that the forceps only squeezed out the central, softened part which subsequently was replaced by connective tissue of new formation: this furnishes another reason compelling us to admit that in a spontaneous manner only the soft part of a follicle, being half fluid and occupying the center, could evacuate itself. All the rest remaining in the thickness of the conjunctiva is in so intimate connection with the tissue that no mechanical means could detach it.

Some authors think that the denuded follicle after the evacuation of a certain part of its contents does not cover itself over again with epithelium and forms at the conjunctival surface a sort of well-marked ulceration, which progressively destroys the follicular débris and transforms itself finally into a cicatrix. We shall come back in the course of this essay to the question of conjunctival cicatrices: for the present we will only say that the pretended ulcerations which we see on miscropical preparations are produced at the moment of excision of the fold of conjunctiva necessary for the examination. The light pressure, which is unavoidable in such cases, suffices to break the continuity of the epithelium which covers the follicle and a certain quantity of its contents escapes. Moreover, inversion of the lid alone may be sufficient for the partial expression of the follicle, as we can easily convince ourselves in every case. These are the causes, which create on microscopic preparations, pictures resembling ulcerations.

The etiology of the follicles shows sufficiently that they require a certain time for full development and that they can not appear the first day of the inflammation. Still, we sometimes observe patients at the first day of an acute conjunctivitis who deny ever having had an eye-disease, and yet present a considerable number of large follicles. We must not trust these assertions of the patients. Clinical experience shows that follicles can remain a long time on the conjunctiva without causing any subjective sensation. This fact is proven by the following observation, by no means exceptional.

A patient came to consult me for an acute conjunctivitis of two days standing. Conjunctiva showed a large number of enormous follicles running together in places. The patient claimed that he had never been sick and that his other eye was sound; still examination showed that the so called sound eye was crowded with follicles, although not inflamed.

Among my clinical observations, which I have often joined with anatomical axaminations answering to precise scientific demands, one can draw certain conclusions. I report one, for they all resemble each other.

A young girl of 12 years, who had always been healthy, had been sick for four days. She probably was infected by her younger brother suffering since two weeks with a purulent conjunctivitis in the left eye; palpebral conjunctiva infiltrated, perfectly smooth, and without a trace of existing follicles.

In the right eye the conjunctiva of the upper cul-de-sac is also infiltrated; careful inspection shows there some grayish points of excessive smallness and hardly projecting above the surface. Purulent secretion considerable, lachrymation and photophobia on both sides Anatomical examination of these points shows that they only present the first occasional nuclei of future follicles. During the following ten days the affection diminished visibly after washes of the conjunctiva with corrosive sublimate. Patient stops treatment. At the end of three weeks she comes back with a fresh exacerbation having lasted several days; follicles were then seen easily on both lids.

This observation, as other similar ones, entitles us to the belief that during the first days of inflammation there my be formed follicular nuclei only; when conditions are favorable, they are transformed into full follicles and become apparent.

From the first moments of their existence the follicles are the seat of two processes entirely opposite in nature: continual absorption (attraction) of lymphatic cells from the neighboring tissues on one hand, resorption of these regenerative elements on the other. The first of these phenomena predominates at first, the follicles increasing in size. Towards the end the migration of white cells is reduced to a minimum. Now it is the resorption which exceeds absorption (attraction). If the follicle has the capsule on the side of the skin, it now loses it, since it ceases to exert pressure on the neighboring tissues, which was the case during its growth. The lymphatic cells become more and more rare and are replaced in like proportion by cellular tissue.

The outlines of the follicles become less distinct and are recognized only by their presence in the midst of a tissue deprived of cellular infiltration. Finally the follicles disappear without a trace. This disappearance is gradual and may last for years. I have found follicles in the process of resorption long after the inflammatory action had ceased.

Suppose a new exacerbation comes at the moment when the follicle has undergone only partial resorption. What will happen? If the exacerbation comes at the beginning of the disease when the adenoid tissue has not yet been modified a great deal nor lost its anatomical characters, the follicle is in the same, or nearly the same, conditions which were favorable in the first place to its evolution, and it will easily come back to its first appearances. The thing is different, when the sub-epthelial tissue has lost its distinctive characters and been transformed into compact cellular tissue. Here the follicle does not increase or, at least, very little on account of the capsule, which surrounds its entire periphery, and developing at the expense of the connective tissue which limits the follicle on all sides in this advanced stage of the disease. On the other hand, connective tissue now replacing the contents of the follicle is no longer distinguished from the surrounding cellular tissue and also opposes the accumulation of lymphatic cells. The pressure sustained by the capsule is little and it is for that reason that its fibres no longer undergo transformations which we observed in the capsules of young follicles during the period of growth. They do not run together and are frequently disposed in a concentric fashion, the lymphatic cells passing outward and often forming regular rows between these fibers.

During the stage of re-formation the follicles are not distinctly visible on the plain of inflammatory infiltration, their outlines run together with the mass of lymphatic cells and often we cannot recognize them, except by their characteristic nuclei.

Oculists have made use of the particular appearance of these follicles in making them pathognomonic signs of trachoma and considering these productions as having nothing to do with the follicles developed during acute forms.

This erroneous opinion is the result of unsystematic and superficial anatomical studies. *Rejecting the existence of follicles of different origin we at the same time overthrow the base on which is founded the theory of trachoma as an independent affection.*

IRIDECTOMY NECESSARY TWELVE AND FOURTEEN DAYS AFTER NORMAL EXTRACTION OF CATARACT.

Written for the Ophthalmic Record by

PETER D. KEYSER, M.D.,

Philadelphia, Pa.

It is the desire at the present day of most operators to make cataract extractions without iridectomy, although the iridectomy with or previous to the extraction is advocated by many experienced ophthalmologists; and I am sure that every busy practitioner runs across cases in which he finds it necessary to remove a piece of the iris at some time of the operation, especially when prolapsis takes place immediately at or very soon after the extraction, and cannot be replaced by the action of eserine or the gentle manipulation with the spatula, etc. Prolapsis generally takes place during the first twenty-four hours after the operation, but I have had it to occur after thirty-six to forty-eight, and I wish to record two cases in which extraction was made without any break or mishap, that did well for some days when a small opening in the corneal incision took place from some unknown cause, allowing the iris to prolapse, at first but little and then gradually enlarged causing very great distortion of the cornea.

Mr. Henry M., æt. 74, came to my clinic at the Wills Eye Hospital July 2, 1892, with cataract R. E. Not operating in the hot weather he returned in Sept. On the 24th of that month I made extraction without iridectomy. Iris contracted normally after the removal of the lens and everything went well Next day eye looked well, iris in good condition and position. On the third day the pupil was a little irregular in form, being slightly drawn up, but the wound of the cornea appeared adherent and healing. Fourth day a small pigmented spot was showing in the outer angle of the corneal inscision without any irritation or pain. This continued without change until the tenth day after the extraction when it began to enlarge and draw the pupil farther up. All this time there was no pain nor special increase of inflammation. On the fourteenth day the iris had prolapsed along nearly the whole line of the corneal incision, but at the same time was adherent to the cornea. The cornea became very much bulged out and distorted. The media clear. Vision good. To permit the cornea to come to a more natural curvature, iridectomy was made. The iris being firmly attached to the edge of the cornea, it was first carefully cut therefrom with a cataract knife, then drawn away and cut off with the scissors. The eye healed well, cornea flattened more, and on Nov. 8, Vision with + 10 D. $\asymp$ + 2.5 D. cyl. 180° was $\frac{6}{15}$.

Mr. Geo. S., æt. 45, cataract both eyes. Was admitted into Wills Eye Hospital Nov. 4, 1892. Nov. 8, extraction R. E., no iridectomy. All went well. First twenty-four hours eye in good condition. On second day without my order or knowledge atropia was instilled into the eye which widely dilated the pupil. On the third day a very small prolapse was noticed which remained in this condition until the seventh day when it began to gradually enlarge along the line of the corneal incision. The whole change was spontaneous as no cause could be found for it. On the 20th, twelve days after the extraction, made iridectomy to relieve the great irregular curvature in the cornea which had taken place. Healed well and vision is, + 11. D. ⊂ + 2.5 D. with cyl. 145°, $\frac{6}{15}$.

Dec. 1, 1892. Extraction L. E., no iridectomy. All did well this time. No atropia used. Dec. 17, vision with + 11. D. ⊂ + 2.5 D. cyl. 180°, $\frac{6}{15}$.

These two cases are instructive in so far as they show that an eye operated on without iridectomy is not relieved from the danger of prolapse of the iris for some considerably longer time than is generally supposed.

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◆

DR. WEYMANN

Has given us an easy and clear translation of Mutermilch's paper on "the pathological anatomy of chronic inflammations of the conjunctiva." We are sure that all who read this paper in this issue of the *Record* will feel like thanking the author for giving us the results of his pains-taking observations, and the translator for serving to us this valuable information in English.

◆

OPHTHALMOLOGICAL SECTION OF THE PAN-AMERICAN MEDICAL CONGRESS.

On another page of this issue will be found the list of officers, executive, honorary and advisory, of this Section. If President Chisolm excites a *working* interest in all of his official associates the meeting is destined to be a grand one. We prophesy that a larger number of ophthalmic surgeons will be present at this meeting in Washington in Sept. next than have ever been in one gathering on this continent. A goodly number of these will present well prepared papers by which the balance of us will be edified. We hope to be able to give the title and author of the several papers to our readers before-hand, so that they may know the nature of the feast to be spread before them by our President Chisolm.

◆

A NEW OPERATION FOR PTERYGIUM.

Perhaps every operator who has had much experience in removing this growth, has now and then seen it return in spite of the care exercised in the operation. It is generally conceded that the return of the growth is due to some part of the ocular conjunctiva attaching itself to the denuded surface of the cornea; and, with this thought in mind, operators are usually careful not to cause the conjunctiva to overlap the cornea when they bring the margins of the conjunctival wound together with stitches. The object of this editorial is to call attention to a little device of our own, as effective in preventing a return of the growth as it is simple in execution. The growth can be removed in any one of the several ways recommended by different operators. This done, our device consists in making a vertical incision above and below, each about $\frac{1}{8}$ inch long and about $\frac{1}{12}$ inch from the most projecting part of the denuded margin of the cornea. The two conjunctival stitches are taken in the usual way for covering the exposed sclera. When these are tied the parts are brought together, without throwing the conjunctiva near the corneal margin into folds. As can be seen, there is the minimum of danger that any of the conjunctiva will become attached to the cornea before it is covered by epithelium.

For the best results in the way of leaving a clear cornea, the corneal part of the pterygium should always be removed by traction, never by dissection.

MUSCLE SHORTENING vs. MUSCLE ADVANCEMENT.

In doing either of these operations on the recti muscles one of the chief dangers to be considered is turning the eye-ball on its antero-posterior diameter, in such a way as to throw unbearable strain on either the superior or inferior oblique muscle. In any of the several operations for advancement there is danger of fixing the tendon in its new position a little too high, thus throwing strain on the inferior oblique, if the muscle advanced be the external rectus, or on the superior oblique, if the internal rectus be the one advanced; or the point of fixation of the advanced tendon may be too low when the strain on the obliques must be the reverse of that given above. In addition to the danger of "twisting" the eyeball, there is the additional danger that the knots may slip, or the threads may cut the conjunctiva and sub-conjunctiva, before strong adhesions have taken place between tendon and sclera, and thus the divided tendon is pulled back even beyond the point of its original attachment, when the patient's condition will be worse than before the operation. In DeWecker's advancement operation, since the middle fibres of the tendon are not divided these will prevent the tendon's going back very far in case the knots slip or the threads cut. Of all advancement operations DeWecker's is least objectionable, for the reason that the two things to be dreaded are less likely to occur than in all other advancement operations.

Believing DeWecker's operation to be the best of its class, and thinking that some of our readers may not have seen it described, we venture here to give our understanding of the technique of this operation. The conjunctiva is incised vertically over the insertion of the tendon, sufficiently to expose it well. Now the upper and lower two-fifths of the tendon are divided at their insertion, while the middle one-fifth is left uncut. With one needle and one thread the upper divided part of the tendon is advanced, the needle being made to penetrate first the tendon, then the conjunctiva and sub-junctiva above and towards the cornea. A similar stitch is then taken through the divided lower part of the tendon and the conjunctiva and sub conjunctiva below. In tying these stitches sufficient force is exerted for advancing the cut parts of the tendon as far as the judgement of the operator may decide. The stitches are allowed to remain in 4 to 6 days, depending on the amount of reaction. The undivided part of the tendon serves a double purpose: 1. it prevents, to a great extent, the setting of the tendor too high or too low, and in that much avoids "twisting" the eye-ball on its antero-posterior axis; 2 should the knots slip or the threads cut their way out too soon, these undivided fibres prevent the tendon from going very far back behind the original point of attachment. This partial advancement reminds one of Stevens' partial tenotomies, the one being the reverse of the other.

DeWecker's *advancement*, the best of all operations of this class, has been discribed so that a fair contrast may be drawn between it and our own *shortening* operation.

Our operation for *shortening* a rectus muscle is simple, effective and free from the two prominent risks incurred in any of the *advancement* operations. In this, as in many other operations on the eye, cocaine anæsthesia can be relied on. The first step of our operation consists of a vertical conjunctival incision $\frac{1}{8}$ inch behind the insertion of the tendon and a little longer than the muscle is wide. From the lower extremity of this cut a horizontal conjunctival incision is made $\frac{1}{4}$ inch long, near to, and parallel with, the lower border of the muscle. The triangular flap of conjunctiva is now dissected up, and is held out of the way by an assistant. The second step of the operation consists in passing a strabismus hook beneath the tendon and in making a slight dissection of the connective tissue and capsule of Tenon at upper and lower border of muscle. Everything is now ready for the last operative procedure, the taking of the stitch for shortening the muscle. A thread is armed with two needles slightly curved. One needle is passed through the muscle from its outer surface and is brought out beneath the lower border of the muscle, the other is passed in same way but is brought out beneath the upper border of the muscle. The amount of tissue thus included in the loop need not be more than $\frac{1}{4}$ the width of the muscle; and the distance of this loop behind the insertion of the tendor must depend on the amount of shortening desired.

The muscle is held away from the globe by fixation forceps while the needles are being passed as above indicated. The operator now taking the hook into his own hand draws it slightly back and at the same time gently lifts the tendor from the globe. He now takes needle No. 1 and pierces the tendon from the ocular side, at its point of insertion and between the center and its lower border, bringing it out through the conjunctiva over the insertion, then removes the needle. In a similar way needle No. 2 is passed through the tendon between its center and upper border and is brought out through the conjunctiva over the insertion. This needle is then removed. The two ends of the one thread need not be more than ⅛ inch apart as they emerge from the tendon. On tying the knot in the usual way, that part of the muscle at the loop is brought in contact with the tendon at its insertion and is there confined by completing the knot. The triangular flap of conjunctiva is now allowed to fall and cover in the exposed muscle, including its "tuck." The stitch is allowed to remain from 4 to 6 days, depending on the inflammatory action excited. The stitch will excite sufficient inflammation to bind the parts in their new relationship, and thus the shortening is made permanent. As in *advancements* so in the *shortening*, it is often necessary to do either a partial or a complete tenotomy of the opposing muscle.

A muscle thus shortened is not likely to "twist" the eyeball; if the twisting occur it would be but slight as compared with the result of an ordinary advancement. The stitch taken in the tendon will not cut its way out, as is so common when taken in the conjunctiva and sub-conjunctiva, therefore there will be no slipping back of the muscle from this cause. Should the knot untie the muscle cannot go further back than before, for no part of it has been cut loose from its original attachment.

The "knuckle of muscle" made by the operation undergoes absorption so that, in a few weeks, the parts become smooth at the site of the operation.

The operation described above we have done many times, with much satisfaction. Even if it had been devised by some one else, we think we would still prefer it over the very best advancement operations, and for the reasons given.

Department of Otology, Laryngology and Rhinology.

GEO. H. PRICE, M. D., EDITOR, 621½ Church Street,
NASHVILLE, TENN.

THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY, STATED MEETING HELD ON WEDNESDAY EVENING, JAN. 25, 1893.

Dr. Robert C. Myles presented a number of curettes, with malleable handles, which he has found very serviceable in operations upon the necessary cavities. He also presented a syringe for puncturing the cheek and the Antrum of Highmore.

Dr. James E. Nichols presented a patient, a stone-mason by occupation, who five years ago was struck on the head by a falling body, producing a fracture on the frontal bone. For two years he suffered from severe pain in the right eye, with protrusion of the eye-ball and finally the eye became sclerosed. After a time a sinus appeared below the right eye. A probe introduced through this reveals a fracture extending through the orbital plate of the frontal bone, as far back as the opening of the sinus. The os planum of the ethmoid is separated entirely from its attachment, and there is a discrepancy of nearly half an inch in the line of the orbit. The sequestrum has not yet separated. Dr. Nichols said he shortly hopes to remove the dead bone by incision.

Dr. Nichols also presented a woman who had suffered from an abscess in the region of the eye, causing considerable exopthalmos. There was necrosis of the supra-orbital ridge and the orbital plate of the frontal bone, so that the frontal sinus was laid bare. With the electric motor he drilled a hole through the nasal cavity up through the frontal bone, entering into the lower part of the sinus. This was kept open for two month by means of a tube, when the sinus was allowed to close.

Dr. D. Bryson Delevan presented a patient, a Russian, who three years ago was affected with scarcoma of the nasal cavity. He lived in St. Petersburgh at the time, and the growth was removed without the use of an anæsthetic. Afterwards under ether, an incision was made in the median line for the purpose of exploring the frontal sinus, but this plan was abandoned. The patient then went to Berlin, where Frænkel, by means of the galvano cautery, removed the sarcomatous growth from the nasal cavity. Dr. Delevan said he simply presented the case, which is one of recurrent sarcoma, to call attention to the fact that if the surgeon who performed the first operation had employed transillumination in studying the frontal sinuses, he would not have inflicted such a scar as this man carries. The nasal bones, once separated, never come together again. The man underwent a severe operation to no purpose, because so far as we are able to learn, there was no sarcomatous growth found in the frontal sinuses.

Dr. M. D. Lederman said he recently saw a patient whose nose was split in order to remove a nasal polypus. The scar in that case was very evident.

Dr. A. Rupp presented a skull showing an anomalous condition of the accessory sinuses. On one side the frontal sinus was considerably deeper than on the other, and opened into the sphenoidal sinus.

Dr. Wendell C. Phillips said that by looking at the skull, he judged it to be a case of cystic degeneration communicating with the antrum.

DISEASES OF THE ACCESSORY SINUSES. TREATMENT AND INDICATIONS FOR OPERATIONS.

Dr. Robert C. Myles read a paper on this subject, and presented a number of patients and anatomical specimens, and read the history of several interesting cases to illustrate his remarks. He first gave a short description of the anatomical situation and relations of the maxillary, the frontal, the ethmoidal and the sphenoidal sinuses, and stated that up to within a few years the diseases of these areas were seldom diagnosed until made manifest by the Versuvius-like demonstrations of their own. The frequency of cases in which these empyemic conditions are undiscovered would indicate carelessness or want of faith by most observers in the later diagnostic methods.

Although the physiology of these cells, Dr. Myles said, is not definitely settled, an analysis of their function points to the conclusion that they are intended to supply warm air and moisture for respiratory purposes. As to the cause of pyogenic conditions in these cavities, they can be conveniently separated into two classes, i. e. those of the antrum maxillaris and those of the ethmoid frontal and sphenoid sinuses. Excluding tumors, we can divide the cases of the antrum of Highmore, in a causal sense, into two divisions: First, those originating from the teeth in alveolar periostitis, periodontitis, attended by suppuration, caries, necrosis or other pathological changes at the root end. Second, those that find their origin in different congestive, inflammatory or proliferative conditions of the nasal and accessory sinus, mucous, submucous and periosteal tissues The relative frequency of nasal and dental origin is a difficult question to decide, on account of the insidiousness of the early symptoms, the delay on the part of the patient in applying for relief and the physician in making the diagnosis. In regard to the cause of ethmoid, frontal and sphenoid cell disease, the majority were due to polypoid degeneration.

As to the diagnosis of this condition, pus or muco-pus discharging from either one or both nostrils, as anterior or postnasal catarrh, and extending for any definite length of time, should always awaken our suspicions. Antrum disease, caused by the teeth, is generally unilateral, the discharge coming from one nostril and usually producing an unpleasant odor. The electric light, placed in the mouth, (the patient being in a dark room) will usually show the respective cheek beneath the eye to be dark and the opposite cheek, will present in splendid contrast, an irregular oblong illumination just below the lower lid. The electric light test is not infallible, but to one who uses it properly it is indispensable. For antrum use it is well to select a three-candle power, about six volts and one and one-half amperes. In certain cases the electric light will demonstrate both antrums dark, and there will be no empyemic symptoms whatever. This condition is probably due to a peculiar thickening of the mucosa in that individual.

With regard to the treatment of diseases of the accessory sinuses, Dr. Myles said that the surgical rules for allowing the escape of purulent matter, curetting, removing dead bone, the application of caustic and antiseptic remedies to unhealthy and proliferative tissues should be undertaken here, as elsewhere, as early as possible after the detection of these cases. In many of them, however, there is so much surface area involved, and the patients are in such poor condition, that many months may be required for the numerous operations near the base of the brain. When the teeth are the cause of the antrum trouble, they should be removed and an opening drilled or trephined into the antrum. This opening into the cavity should be enlarged, until it is about 8 to 10 millimetres in diameter, and then, with the blunt and sharp curettes the antrum should be carefully explored and all granulation, polypoid and pyogenic tissues, as well as the softened or dead bone should be removed. The cavity is then packed with iodoform gauze, which in some cases requires changing every twenty-four hours; in others not so frequently. Solutions of boric and carbolic acids and peroxide of hydrogen seem to be the best for general daily irrigation. In order to destroy persistent granulating tissue, the speaker said that he has employed with varying success nitrate of silver, pyoktannin, alcohol, zinc, iodoform, etc. A remedy which in one case acts like magic in another case makes but little impression. In stubborn cases he has generally found extensive softening of the bone. In disease of the ethmoid and sphenoid cells a perforation should be made through their floors, first having removed the middle turbinated body. The small drill or trephine should be used, but in a very guarded manner. The frontal sinuses present more perplexing problems than any of the others. An external operation is usually refused by the patient. As it is necessary to have an opening from the nose up through the anterior ethmoidal cells, even in the event of the external operation, Dr. Myles said that he generally clips, drills, trephines or curettes an opening along the infundibulm up into the frontal sinus, at once removing, if possible that part of the nasal process of the superior maxilla which forms the floor of the sinus, and the severe headaches usually subside.

Dr. Harris Allen, of Philadelphia, in opening the discussion, stated that his experience in this department of surgery, was so different from that given by Dr. Myles that he hardly felt qualified to discuss the paper. With him, the diagnosis of these conditions is the chief point, as the patients almost invariably decline operation. He has seen a number of cases of empyema of the frontal and maxillary sinuses, and one of the sphenoidal sinus. Quite a number of these were of traumatic origin, due to the extraction of a tooth, and such patients often give a history of a rheumatic or other imperfect state of the general system, which is prone to give rise to inflammation elsewhere. Dr. Allen gave the history of a number of cases to illustrate this point. In one case of empyema of the maxillary sinus in a rheumatic subject the condition was relieved, only to be followed, two months afterwards by an empyema of the opposite sinus. Where such a diathesis exists, an inflammatory process may be lighted up by an apparently trivial cause.

In another group of cases, Dr. Allen said, the disease is the result of direct continuity of the inflammatory process. As regards the employment of the electric light in these conditions the speaker said that while he never makes a diagnosis without reaorting to this test, he does not consider its use indispensable. On account of the possible difference in the thickness of the bones of the two sides, the test is not always an infallible one. In a person with thick maxillary bones, you may be deceived by the transillumination. It should not, therefore, be regarded as the final test The pain over the fossa, and the fullness that is apt to exist he regards as important symptoms. Dr. Allen said he hoped that with our improved methods of local treatment in inflammation of the accessory sinuses we would have fewer excuses for operating. Pyoktanin he has found very useful in some of these cases. Under its influence the conditions uniformly improve. Respecting the means by which the maxillary sinus should be opened, the extraction of a tooth, by itself. is valueless. Very often, when this is done, and an opening drilled through its socket up into the sinus, we may entirely fail in our object, and another operation must be performed, either going in through the nose or above the alveolar process. The best way of entering the sinus is to go in above the alveolar process, never through the tooth cavity, and the opening made should not be larger than is absolutely necessary. In some cases, in entering the sinus, where he found the bones, soft, he made a semilunar incision: there is a certain amount of adaptability or yielding to these bones, and the front of the maxilla can often be pushed upwards.

Dr. J. H. Bryan, of Washington, D. C. said that his experience with these inflammatory conditions had been somewhat different than that of both the previous speakers. He judged that most of Dr. Myle's cases were due to intra-nasal disease. His cases have chiefly originated from the teeth. He believed, with Dr. Allen, that many of these cases are due to the method of treating the teeth. A number of his cases were traced to the use of arsenious paste employed by dentists to kill the nerve of the tooth, the nerve not being thoroughly removed.

As regards symptoms, Dr. Bryan said he considers the light reflex as an interesting one, but he thought it was rarely witnessed. He has only observed it in two or three cases. Pain he has found to be almost invariably absent, excepting, perhaps over the canine fossa. The patient rarely complains of pain over the entire maxillary sinus. The odor from the discharge is perceptible to the patient: not so much to his friends This is an interesting point of differential diagnosis between this condition and atrophic rhinitis, where the odor is very perceptible to the patient's friends and not to himself. The discharge of pus through the nostrils is an interesting symptom, but it is common to suppurative inflammation of the maxillary, ethmoidal and frontal sinuses, so that it cannot be entirely relied upon. The electric light, Dr. Bryan said, he thought a very decided aid in the diagnosis of affections of the maxillary sinus. In many cases it has seemed deceptive because its use is not entirely understood. For instance, the rays of light, in passing through the nasal cavity, are deflected by the turbinated body, and thus may give rise to a false impression. According to Davidson, the illumination of the eye is the only positive sign in an abscess of the maxillary cavity. The speaker said that in several cases of abscess of the antrum in which the discharge into the nasal cavity was absent or very slight,—the so-called latent abscesses—he was ventured to make the diagnosis simply by the odor.

In regard to the treatment of ethmoidal abscesses, Dr. Bryan said he does not feel inclined to act quite as heroically as some operators, who remove the middle turbinated body and then curette. He is of the opinion that many of these cases would get well without resorting to such extreme measures, and this opinion has been verified in a number of instances. In regard to the treatment of abscesses of the antrum, the best results he thought are obtained by entering through the alveolar process. If the tooth is present, of course that must be removed. For opening the sinus, the trephine gives us a better opening than the ordinary drill. He has done the intra-nasal operation several times, using for that purpose the instrument devised by Dr. J. Solis-Cohen. A number of cases of abscess of the antrum have been reported as cured by the use of injections of peroxide of Hydrogen through the natural opening in the middle meatus, but it is a very painful and tedious process and the hope of a cure is very slight. Dr. Bryan said he cannot recall a single case of polypoid degeneration of the antrum. As far as curetting the cavity is concerned, his patients have never allowed him to do it. He presented an instrument composed of a combined gouge and curette, to be employed in opening the ethmoidal cells· It has given great satisfaction in cases where there is much swelling of the anterior extremity of the middle turbinated body. He considers it superior to the drill or snare. The curette is small enough to enter the anterior ethmoidal cells and remove any carious bone. In suppuration of the antrum conditions may be present which we fail to recognize. There may be an extension of the polypoid degeneration, or cysts may form. For the purpose of thoroughly exploring the cavity, Dr. Bryan said, he has employed the endoscope devised by Dr. W. K. Otis.

The opening in the canine fossa or alveolar process can be enlarged, and the endoscopic tube passed in, and then, by means of the small mirror attached to the instrument the whole interior of the cavity is brought into view.

Although pain is an inconstant symptom, it is probably the best one we have in making a differential diagnosis between the diseases of the accessory cavities. Pus, as already stated, is a symptom common to inflammation of one of the three anterior cavities. The electric light (until Davidson called attention to the illumination of the eye) was objected to by some as unsatisfactory. In a case of inflammation of the sphenoidal sinus coming under his observation, the pain was in the middle of the head, not radiating to the various branches of the fifth nerve, but located principally at the base of the brain. With inflammation of the frontal sinus the pain is located at the supra-orbital ridge or over the nasal fossa, while with inflammation of the ethmoidal sinus the pain is located across the bridge of the nose and along the infra-orbital ridge. With chronic abscess of the maxillary sinus the pain is usually absent.

Dr. A. C. Getchell of Worcester, Mass., gave the history of an interesting case. The patient was a woman. The only point of interest in her family history was that her husband died of cancer. She had never suffered from nasal catarrh. She began to suffer from a pain in the right cheek, beneath the eye; this pain gradually became more severe and persistent. A dentist was consulted, but no relief obtained. A diagnosis of abscess of the antrum was made, and by means of a trocar a mass of broken down tissue was removed. This growth proved to be cancerous, and the patient died from a recurrence. During her illness a malignant growth also made its appearance in the left breast

On account of the lateness of the hour, it was decided to postpone the further discussion of this subject until the next meeting of the Section.

WENDELL C. PHILLIPS, M.D., Secretary.

EAR-ACHE.

My friend Dr. Alex. Randall, of Philadelphia, is being quoted in some of our exchanges as follows:

"In conclusion, it may be repeated that ear-ache is most often due to acute tympanic inflammations arising from a naso-pharyngeal condition which demands treatment Cleansing and detergent sprays and post-pharyngeal painting with astringents can control this and relieve any referred pain from this location. The hot syringing of the ear will give any needed cleansing, allay the local pain, and, by reducing the inflammatory congestion, help on the resolution. Protection, local and general, with medicinal treatment of general symptoms, will generally give such prompt and real relief that the host of other remedies may remain as an unemployed reserve. The physician summoned to to a case of ear-ache can generally leave his morphine and cocaine at home, if he will take his brow mirror, syringe, and an atomizer."

In the main I agree with the Doctor. I would, however, advise that the physician leave at home with his morphine and cocaine his *syringe* also, since we have at our easy command a remedy that is far more covenient and much more effective than a continuous stream of hot water however skillfully directed. This remedy is chloroform, fʒi to iss, in olive oil, q s., f℥i—The ear should first be cleansed by means of absorbent cotton on a tooth-pick or probe, in a most gentle manner, after which the ear should be filled with the solution, the patient lying for 10 minutes on the well side. This can be repeated as often as may be necessary. Usually it does not have to be repeated often. Its power to relieve pain, reduce inflammation and prevent suppuration is wonderful. For obvious reason the mixture should not be heated before being dropped into the ear.

G. C. SAVAGE.

THE

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TRACHOMA.

BY JULES MUTERMILCH, M. D.,

TRANSLATED BY L. WEBSTER FOX, M. D.

PHILADELPHIA, PA.

In the January Number (1893) of *Annales D'Oculistique*, Dr. Mutermilch has written an exhaustive article on the pathalogy of trachoma. As the editor of the *Record* has arranged for the publication of an article* by the famous ophthalmic surgeon on "The Pathalogical Anatomy of Chronic Inflammation of the Conjunctiva", I feel that this paper will be an acceptable continuation of the other. Dr. Mutermilch says oculists are far from being agreed on the significance of the term trachoma which serves to determine various forms of conjunctivitis which differ greatly to the naked eye. To some, the presence of a follicule, there need be but one, suffices to prove the diagnosis of trachoma; in others this affection begins when the follicules are developed on the retrotarsal fold (Adamuck); to others again it is the one characteristic which alone permits of the diagnosis of trachoma. As to the etiology of this affection there is a marked disagreement among authorities, who divide themselves into two classes. The one (Dualists) consider trachoma as an essential disease developing under the influence of a specific parasite and having nothing to do with follicular conjunctivitis (Sæmisch.) The other (Unatarists) consider trachoma to be only a consecutive condition of follicular conjunctivitis. There are also a number of ophthalmic surgeons who see trachoma is every chronic inflammation of the conjunctiva, making no distinction between chronic blennorrhea, chronic contagious conjunctivitis, etc., etc.

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*Published in last issue of this Journal.– Editor.

In the chaos of these divers opinions one may find some points on which all ophthalmic surgeons are agreed; these are, the chronic character of the disease in question; its infectious origin; the facility with which it is communicated, often taking an endemic character; and, finally, the gravity of the affection, for it frequently provokes very serious complications in the cornea.

If we compare the clinical observations with those given anatomically, we arrive at conclusions essentially contrary to the ideas formerly admitted by the authorities on the subject of trachoma; we easily see that no definition of trachoma is satisfactory and that the contagious character of the disease, as gene ally accepted, is false, owing to there being no basis of real facts.

Histological research made in many different cases of chronic conjunctivitis has shown me from an anatomical standpoint that there are different forms of chronic inflammation. In all conjunctival inflammations, so dissimilar to the naked eye, from the simplest to the most exaggerated, I constantly find the same anatomical alterations, not differing in the least degree. The clinical observations are not in discord with the anatomical pictures, but, on the contrary, confirm in a very evident manner the gradual change of one form of the disease to the other. Those students who consider Trachoma as an independent affection and distinct from follicular conjunctivitis, base their opinion on the following fact: Follicular conjunctivitis generally heals without leaving any mark or cicatrice and provokes no complications in the cornea.

As a general rule the classifications based on the aspect, and the different size of the folliculcs, their localization, and other points h ve no foundation, and are the cause of the confusion existing on the subject of trachoma. The follicule, I am convinced, is nothing but the result of the lymphiod infiltration exaggerated in the sub-epithelium tissue (adenoid.) As the abundan't migration of the lymphoid elements of the vessels is provoked by the divers agents, and as this phenomenon is observed in the various morbid processes, the follicule may accompany all the inflammatory affections of the conjunctiva, some being the origin and intensity of it. Already the elevation of the hyperæmia of the conjunctiva may give impluse to the production of follicules, especially in badly nourished individuals. After the instillation of atropia or eserine into the conjunctival sac, we may see numerous follicules produced: Dust, smoke, irritating vapors, which may have acted for some-time on the conjunctiva often produce the active development of the follicules. Individuals who have errors of refraction, especially when not corrected by glasses, are subject to ocular hyperæmia, by reason of the constant effort of accommodation and in these persons are often observed in the conjunctiva these follicules more or less abundant, following the general condition of the organization. Consequently one need not be surprised to find the conjunctiva filled with follicules after the minimum alterations of the epithelium, and to see these productions disappear only after the improvement of hygienic conditions. Thus then, that which certain ophthalmic surgeons name follicular conjunctivitis is often not even an inflammation. One ought to speak of this singular state of the conjunctiva by the name of folliculosis employed originally by Adamuck. (It is necessary to remark that this author has given a marked significance to this expression.) If then in folliculosis the alterations of the conjunctiva do not progress, and if this condition is not transformed into typical trachoma (granular ophthalmia of the authors), it is not because the fulliculosis and trachoma present two distinct forms produced by two different parasites, but for the simple reason that the folliculosis is not an inflammatory process. The production of follicules explains itself easily as we already know in all normal cases pre-eminently inflammatory, for there exsists many favorable conditions to their development.

Inflammation of the conjunctiva may last for a longer or shorter period, according to the species of the microbe, the hygienic condition of the patient, and the general state of his organization.

Every ophthalmic surgeon has had occasion to notice frequently conjunctivitis characterized by the presence of abundance of follicules, cured comparatively quickly without any traces or complications of the cornea; these inflammatory forms which have been wrongly included in the same class with the folliculosis, often terminate favorably, not because of the quantity of the follicules nor when they have developed in the conjunctional cul-de-sac, and not on the tarsus, and finally are not of the same nature as the microbes which have given place to them. Agents are at work here of a totally different nature, to find which we must inquire into the hygienic condition of the patient, and, what is more important perhaps, into the general state of his organization. Ophthalmic surgeons, who have had the opportunity of observing the endemics of trachoma in schools, prisons, garrisons, endemics striking one locality, report very interesting facts which give us a new light on this vexed question of the origin of trachoma, from a clinical standpoint at least. They maintain that all the milder forms of follicular conjunctivitis are trachoma. Nuel and Leplat, ardent followers of Saemisch, have watched an endemic of trachoma in Luxembourg, and declare that their convictions have been shaken, for they have seen the successive change of one morbid form to the other. Wallerstein, who has also had to do with an endemic of follicular conjunctivitis, explains in a categorical manner, that this inflammation transforms itself often into serious typical trachoma. The inverse observations are very interesting and very characteristic; the serious forms of trachoma, self-propagating by contagion, provoke slight conjunctivitis.

I have observed for several years, a family, of which the father was sometime ago attacked by a malignant form of trachoma. Four years since two sons were attacked by this disease; the children complained of a slight suppuration, watering and ptosis, especially when they worked in the evening. I found the conjunctiva hyperæmic, slightly flecked, and containing follicules. After some weeks of treatment (the follicules were squeezed out) the boys were completely cured. In this case, I have no doubt at all that the follicular conjunctivitis of the children came from the father's disease, who, having no idea of the contagiousness of his attack, often slept with one or other of them.

Gerkin, who has recently published statistics of a very serious epidemic of trachoma, it having attacked the inhabitants of a large town of Kasan, reports very interesting details, which prove that among the patients, the youngest were nearly all exclusively attacked by the lighter forms of follicular conjunctivitis.

Joelson describing an epidemic of follicular conjunctivitis in a school, tells us that those who had been longest in the establishment suffered principally from trachomatous conjunctivitis; he observed also, the change of the slight inflammations to the serious ones, and advises us not to be optimistic when one has to do with a mild conjunctivitis.

Schilling observed a similar endemic in Wartenberg, and remarks that parents and the elder children were attacked by trachoma; the children attending school, and those from one to six years old only presented a simple catarrh or disseminated follicules; this author considers follicular catarrh and trachoma to be different phases of one and the same process. We see then that the clinical signs alone do not allow us to pronounce on the nature of a follicular conjunctivitis. Will it terminate in a favorable manner, or indeed, is it the first step of true trachoma? If trachoma and follicular conjunctivitis are two different diseases, then each one must according to the infectious character be provoked by a special microbe. Nevertheless, in spite of the numerous bacteriological researches, which have been made during the last ten years to discover the special microbe of trachoma, none have been given, as far as we know, any positive result. We shall not be accused of exaggeration, when we say that there have been as many microbes found, as there have been investigators. The numerous inoculations made on animals have furnished no better results. The verified inoculations executed by others experimentally bring negative results. The accepted micro-cocci of Michel has not justified the faith placed in it, for Schmidt-Rimpler declares never to have found it in cases of trachoma.

For those who are interested in this question the observations of Staderini are the most remarkable. This author declares that the dipplo-cocci found by him have always given a negative result when inoculated in animals, healthy, well nourished and well cared for. On the contrary those inoculated animals, which were in a bad state of hygiene gave the best results. Would not the inoculation of other microbes be positive in these cases?

In accepting the infectious theory of trachoma, we should be much embarrassed had we to explain many facts presented to us daily, for our observation. Many persons who are intimately connected with trachomatous subjects for many years are not affected by the disease. The conjunctiva of their eyes remains perfectly healthy; thus we see that the husband is not affected by the wife, the children by the parents and vice versa. In my hospital practice during the last seven years, I have not seen the contagion spread between those having healthy conjunctiva, and the trachomatous; not for lack of opportunity, for the patients were all confined in one small room, badly ventilated, no precautions taken whatever, and no suspicion of the possibility of infection. The nurses who have been in service for many years have never been attacked by conjunctivitis, although they daily finger the dressings of the trachomatous, and frequently neglect to disinfect their own hands. Similar facts cannot have escaped the notice of all ophthalmic surgeons, and several who believe in the contagious character of trachoma attribute a very important part to a particular disposition of the organism (Venneman) (Raehlman) and to the scrofulous character of the patient. (Truc.) (Malgat) The majority of the authorities assign bad hygienic conditions and poverty as the chief reason of the propagation of trachoma, and, on the contrary, the well-to-do should be the best anti-trachomatous subjects. Thus then the association of bacteriological research with clinical facts, which frequently gives the lie to the contagious character of trachoma, permits us to conclude that the microbe of trachoma is not yet discovered, for the simple reason that it does not exist.

For the rest, the even course of trachoma proves already that its origin cannot be due to the action of the less predominating microbes. This affection lasts sometimes for ten years, and this in individuals who are not in the most unfavorable conditions for the arrest of the inflammation.

Exacerbations separated by intervals more or less long, repeat themselves ad-infinitum and break out, so to speak, on the least provocation. The slightest excess (an evening passed at the theatre, a few hours reading, the return to customary work) suffices to cause a return of the inflammation which seemed to have quite disappeared. I have often seen patients leave the hospital in very good condition and return the day after with a serious exacerbation.

If we would place the question in a still more critical fashion, we could not rest content with the etiology of trachoma as it is generally accepted, and we must search for reasons more in accord with known facts; and, indeed, the facility with which each fresh exacerbation is caused, in a very serious form sometimes, the insignificant cause which provokes it, all that we know of the same tissue, and its anatomical structure, has made us submit the very important transformations which have weakened the resistance of its elements to the unfavorable actions of exterior agents. The supporters of the infectious theory of trachoma are disposed to attribute the sudden exacerbations to the action of the microbes; this is how they understand the proceeding of the latter:—At the moment when the inflammatory manifestations disappear, the diseased tissue does not become free from the microbes which have provoked them; these microbes continue to live, although inactive, during the entire phase of the apparent cure. Under the influence of certain exterior irritations their vital energy temporarily appeased, awakens; they multiply rapidly and re-commence the destructive process in the tissue which serves them as their abode I do not accept this theory. It is difficult to admit that the microbes remain inactive even for a short time in a tissue which offers them such an excellent ground for culture. These armistices appear to us less acceptable when they last, as they often do, for a year or more, between the trachomatous exacerbations. It is not easy, on the other hand, to admit that each fresh attack is produced by a new infection: they are often produced under conditions which completely exclude the possibility of a re-infection. The exterior agents, such as smoke, dust, etc., which can only cause a simple hyperæmia or at most a slight catarrh in a well conditioned patient, produce in the trachomatous, apparently cured, a serious exacerbation, and no ophthalmic surgeon is surprised. If we allow then, as the chief sign and characteristic of trachoma, the very slight powers of resistance in the tissue where the morbid process takes place, we can then more easily explain to ourselves why trachoma does not constitute an independent disease, why it produces other chronic inflammations, slightly conjunctival, why this affection developes itself without the predominant intervention of the least of the microbes, why finally, it lasts during a long period of years. In order to understand what are the properties of the tissue which determine its greater or less resistance to exterior agents, we ought first to study the physiological character of the epithelial cells which fight the battle for existence in the normal conditions; and then we should examine the alterations of the disease and arrest the progress of it. The normal epithelium of the conjunctiva presents, as we know it, the character of the mucous epithelium and rests on an adenoidous tissue, moist and spongy. Above all there exists in the organism a constant relation between the epithelium and the sub-epithelial tissue The mucous epithelium constituting a secreting, independent organ, demands by reason of its function, an abundant flow of nutritive secretion which it pours into the sub-epithelial tissue, richly vascularized.

Thanks to this adenoidous tissue, the regeneration of the epithelial elements works very rapidly and it is this easy reproduction which causes the resistance of the normal conjunctival epithelium to the pernicious agents. In slight chronic conjunctivitis, catarrhal, produced by the constant irritation of the conjunctiva, be it by smoke, dust, irritant fumes, etc , (in manufacturies, badly ventilated laboratories,) may be finally under the influence of certain microbes, of a less malignant nature, the young epithelial cells situated directly on the adenoidous tissue, not content merely to repair the losses of the superficial range but augment their reproductive energy to such a point that the epithelial strata is notably thickened. It is probable that the thin film of mucous producing epithelium recovering all the surface of the conjunctiva protects to a certain point the superficial layer. If we examine under the microscope the conjunctiva which has undergone trachoma with all its multiple exacerbations we shall see that its epithelium is changed in type, has taken the epidermoidous character and rests upon the compact conjunctival tissue, and has no resemblance, from an anatomical point, to the old adenoidous tissue.

We say then that the inflammatory process is extinguished, but that merely means that the anatomical equilibrium between the epithelium and its base is attacked again, and that the tissue has become as resistant as it was before the disease. What is it that now constitutes this resistance of the conjunctiva. Why have these same insignificant causes which formerly sufficed to provoke a very serious inflammation become now perfectly inoffensive in the same individual? It is not difficult to answer these questions. The epithelial elements with which we have at present to do, regenerate much less energetically than the mucous elements, but in the place of the superficial layers formed by the degenerate elements, almost cartilaginous, present an excellent barrier to the passage of micro-organisms in the depth of the tissue and resist but weakly the exterior agents. In this phase of trachoma we have to do with a kind of epithelium very similar to the external integument: If the resistance of the normal conjunctival epithelium is due to the vitality of its anatomical elements, that is to say, to the capacity of its very rapid reproduction, if the reason is purely physiological, after the termination of trachoma, this resistance is become passive, it becomes so by reasons of a purely mechanical nature.

The mucous epithelium has now pursued a long and steady course, having changed its type to the epidermoidal. It will be easy for us to understand how and why it has worked this transformation if we recall the close connection existing between the epithelium and the sub-epithelial tissue, if we connect the clinical progress of the disease to the anatomical picture of its successive phases. Each inflammatory attack of the epithelium provokes in the adenoidous tissue a cellular infiltration, which sometimes attains considerable dimensions. This infiltration as we know it, often forms more or less abundant follicules.

If the conjunctiva has been attacked at all, be it ever so mildly, traces are not always to be found, because one part of the lymphoidous cells eliminated through the conjunctival sac, and one part is taken up by the lymphatic vessels and so returned to the general circulation, and those, finally, which have suffered necrosis are absorbed, such as the follicules; the adenoidous tissue and the epithelium now return to statu-quo ante. This is what takes place after each acute catarrhal attack of the conjunctiva and after the contagious conjunctivitis. Suppose now that the individual who has had an acute conjunctivitis is attacked for the second or third time, etc., or when the inflammatory process is stopped for some time, thanks to the bad condition of hygiene, the inflammatory infiltration and the quantity of follicules increase more and more; it is evident that the resorption will demand more time and the lymphatic elements degenerate, the follicules and blood vessels, which have developed during the inflammation and disappeared after its termination, are replaced by the conjunctival tissue of a new formation. Greater accumulation of the lymphoidous elements in the adenoidous tissue has been prolonged, the follicules are more abundant, the conjunctival fasciculus is produced anew in the sub-epithelial tissue. There must naturally now result an important transformation of the adenoidous tissue which will lose a large part of the nutritive secretion. This modification of the sub epithelial tissue must forcibly influence the epithelial elements; these, receiving less of the nutritive secretions cannot form the normal type, and assume a different aspect.

The less pronounced modification of sub-epithelial tissues are not without a marked effect on the epithelial cells which do not lose, after the extinction of the inflammatory process, their capacity of rapid reproduction, nor their secreting properties.

It will not be the same when the conjunctival fasciculi develop themselves in large quantities and attach themselves to the adenoidous tissue; in these conditions the regenerated epithelium presents a very original appearance.

The cells situated in the deepest structures present divers, figures, oval or fusi-form, often triangular, at right angles towards the sub-epithelial tissue Among the superficial elements we find a flattened form in which it is often difficult to demonstrate the presence of the nucleus. We have then an intermediate form between the old mucous epithelium and the future epidermoidal; this epithelium has lost in part the resistance of the mucous epithelium by reason of the important modification undergone by the adenoidous tissue; it is no longer able to reproduce rapidly; on the other hand the superficial cells do not sufficiently protect it from behind for they have not obtained the character of the corneal cellules. From the moment that the conjunctival epithelium has undergone this essential modification, the conjunctiva passes to this second characteristic phase, which has been differentiated as an independent disease called trachoma, or, as certain authorities term it, granular ophthalmia.

The epithelium deteriorating easily under the hurtful influence of the agents to which it is momentarily exposed provokes certain reflex alterations in the adenoidous tissue (sanguinary hyperæmia, sanguinary infiltration) ulceration of the cornea (pannus) and it is thus that it presents the typical picture of trachomatous exacerbations. After each of these exacerbations the adenoidous tissue becomes richer in conjunctival fibres. The regenerated epithelium approaches more and more to the epidermoidal epithelium, its superficial cells receive less and less of the nutritive secretions, they diminish gradually and at last we obtain on the surface of the conjunctiva another type of epithelium namely, the epidermoidal. Thus terminates trachoma.

We see then that the cure is effected only when the tissue has made its resistance perfect. Anatomically it is completely changed, but each exacerbation in the progress of this affection brings us to the desired end. As the modifications of the adenoidous tissue are always the same whatever may be the form of the cellular infiltration, diffused, or under the form of follicules, we may unhesitatingly conclude that each inflammation of the conjunctiva, it matters not of what origin, may pass as typical trachoma. So indeed may chronic catarrhal conjunctivitis, follicular conjunctivitis pass as chronic blennorrhea. The epidemic propagation of trachoma still remains to be explained and the circumstances which contribute to this disease have been classed among the infectious ones. The first question finds its answer in what we have just been saying, if an acute inflammation attacks individuals, remaining in close contact and in the same hygienic conditions (garrisons, schools, prisons, etc.) if this inflammation is conveyed to all the patients by the vitiated air of the common habitation (Joelson's case) it is not to be wondered at that these people are later infected by trachoma. As to the possibility of being infected by typical trachoma from intercourse with the trachomatous, I consider that as a scientific prejudice. A healthy man will only take a trachomatous disease as a very slight inflammation. On the normal conjunctiva one constantly finds an enormous quantity of all sorts of micro-organisms. They are simply the result of our sojourn in an atmosphere full of different pathogenic germs, for example in the hospitals, and from the bad habit we all have of rubbing our eyes with non-disinfected fingers. The microbes on perfectly healthy eyes multiply rapidly and give rise to all the phenomena of conjunctival inflammation, but on the pathological conjunctiva of the trachomatous, the number of the germs and the many varieties are considerably greater. Petresco read before the Ophthalmological Society of Paris (1888) his researches on this point and speaks of microbes *staphylococcus albus, aureus, citreus* and even the *strepto-coccus.* It is not surprising to find the secretion of a trachomatous eye provoke a catarrhal or a very serious affection in a healthy eye, a similar result may be produced by inoculating a healthy eye from pus taken from a suppurating wound. It is true that the benign inflammation produced in this manner may give rise to true trachoma, but the origin of the infection has not the importance of a veritable etiological starting point, it being only an accidental agent.

The pathological processes develop and progress in the same manner in the same tissue, it matters not where it is situated in the organism, for the cause is the same in all cases. We must now wait for the careful examination of chronic urethritis, giving analogous results to those which we have obtained from studying trachoma. The position of the oculist is so much the more advantageous in that it allows him to follow step by step the inflammatory process, to study successively the anatomical pictures, and, which is very important, its very close connection with the clinical progress. On the contrary, a similar study of chronic blennorrhagia of the urethra is impossible, and it is, it seems to me the only reason why there is not a single work on this question from which we can obtain analogous results to mine.

In recent literature concerning chronic blennorrhagical urethritis we find some facts which justify my supposition.

Baraban, in 1890, published a very interesting paper on the modification of the urethral epithelium in a man attacked by chronic blennorrhagia. He observed the change of the cylindrical epithelium to a stratified flat epithelium, and attributes it to the prolonged irritation of the cellules by the gonococci and to a fault of nutrition which lasts even when the last parasite has disappeared from the tissue. In his treatise on the anatomy of chronic blennorrhagia in man, Singer considers equally the passage of cylindrical epithelium into pavement epithelium and affirms categorically that this transformation is in relation with the altration of the sub-epithelial tissue.

I am convinced that these writers have not obtained results absolutely identical with mine for the simple reason that their microscopical researches have not been made parallel with clinical observations.

CONTRIBUTION TO THE STUDY OF HEMORRHAGIC GLAUCOMA.*

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Translated from *Annales d'Oculistique*, August, 1892,

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The conditions in which hemorrhagic glaucoma occurs are indeed well known, and the characteristic vascular alterations in this affection have been described before to-day. Let us recall only the theses of Hache (1874) and of Interiano (1881), which, in the midst of numerous published observations, represent all of them ; and their conclusions still preserve their value. † Notwithstanding this, the exact notion of the distinct nature of hemorrhagic glaucoma is far from being generally accepted and settled ; and for proof we need only to refer to the observation recently published by Deutschmann in his "*Beitrage zur Augenheilkunde*" (1890). In this case which is entitled "hemorrhagic glaucoma" is found, truly, the history of acute glaucoma complicated by hemorrhages, with the ordinary phenomena of optic excavation and occlusion of the iris angle, but nothing, however, which in our opinion constitutes the characteristics of hemorrhagic glaucoma ; there is no mention made of the vessels or their alteration.

It has, therefore, appeared to me that it is not inopportune to return to this question, inasmuch as we are able to offer, in support of the theory which we maintain touching the essential anatomy of hemorrhagic glaucoma as compared with simple glaucoma, the evidence of four specimens taken from our anatomico-pathological collections at the Quinze-Vingts. These specimens have been prepared according to the ordinary technique and embedded in celloidine by our laboratory assistant, Dr. Dubief, with whom we have studied them.

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* Communicated to the Ophthalmological Society of Heidelberg, August, 1892.

† In a thesis, quite recently, our pupil, Dr Bourgon, has treated the question in its entirety in relating some of the observations which follow.

Before taking up the theory, let us look at once at the clinical facts and the results of histological examinations :

Obs. I.—*Clinical Examination.*—Man, aged 66 years, manifests arterio sclerosis. Left eye began to trouble him six months ago. December 10, 1889, O. D., V = 1; O. S., hemorrhagic retinitis. Tension and visual field normal on both sides.

December 26, left eye is affected by an attack of acute glaucoma, with blood in the anterior chamber and reddened iris. T + 3. V = O. Pain intense. Eye enucleated.

Histological Examination.—Slide No. 978 of the laboratory.—Choroid : Nothing abnormal in appearance

Retina : The different layers of the retina are well colored, and clearly distinguished from each other. There exists some vacuoles, localized principally around the optic nerve. These vacuoles contain no exudate ; they lie in the region which extends from the cerebral plexus (internal granular layer) to the basal plexus (external granular layer). The size of these vacuoles is inconsiderable. In various points of the retina and in the same layers as those which present the vacuoles are seen small hemorrhagic foci.

The retinal vessels show a very pronounced hyaline degeneration. All are excessively thickened : some are obliterated. The vascular endothelium, however, is preserved in the vessels which are still permeable.

Optic nerve : Thickening of the sheaths. Excavation.

Ciliary body : Enormous dilatation of the vessels which resemble, in some particulars, wide hemorrhagic trails.

Iris : The vessels have undergone a hyaline degeneration, analagous to that of the retinal vessels, with preservation of the endothelium. The iris angle is not closed. The canal of Schlemm is free, and in some sections, even dilated Fontana's spaces are the same.

Obs. II.—*Clinical Examination.*—Man, aged 45 years. Affected by a paralysis one year. Murmurs of the heart.

The left eye began to trouble him in July, 1887. In September of the same year there was found in the right eye hemorrhagic retinitis: $V = \frac{1}{2}$. Left eye, acute glaucomatous tension. Fundus invisible. T. + 3; V. = O.

Enucleation was performed after an ineffective sclerotomy.

Histological Examination. Slide No. 58,535.—Choroid: Considerably thickened. This membrane has, at certain points in the posterior pole of the eye, increased in thickness tenfold. This increase of volume is due to an enormous infiltration of lucocytes. No vascular alterations visible. In its peripheral parts and on level with the ciliary body the infiltration scarcely exists.

Retina: The retina, especially in its central parts, is distorted by a very large quantity of enormous vacuoles intermingled with each other. These vacuoles occupy, principally, the internal layers of the retina from the layer of nerve-fibers to the basal plexus (external granular layer) exclusively. They contain a fibrous exudate more or less retracted, which becomes rose-colored by carmine. The vessels are the seat of a very marked hyaline degeneration.

It is to be noted that the retina shows no vascular alteration in the portions most peripheric. We have not been able to find there a trace of hemorrhage.

Optic nerve: Slight excavation. The dural sheath is much thickened.

Iris: Very much increased in thickness. The vessels are degenerated. The anterior chamber is filled with exudates which obstruct the iris angle. This angle is obliterated.

Obs. III. *Clinical Examination.*—Woman, 59 years old. Arterio-sclerosis; rigidity of the radial arteries. The left eye has been troubling her for three months.

February 14, 1889, O. D., $V. = \frac{2}{3}$; O. S, hemorrhagic retinitis.

February 21. Patient returned with O. D., $V. = \frac{2}{3}$; Tn. O. S., acute glaucomatous tension, with bloody appearance of the iris. T. + 3; V. = O.

Severe pain. Fundus invisible. Enucleation.

Histological Examination. Slide No. 1691.—Choroid: Enormous dilatation of the vessels, which appear eight to ten times their normal size.

Retina: While the peripheral parts are sufficiently well preserved as to structure, the portions of the retina which are adjacent to the optic nerve are the seat of cystoid degeneration more or less considerable, and this at certain points is so complete that the general physiognomy of the nerve-membrane is scarcely recognisable. The cystoid degeneration is especially marked in the internal layers as far as the basal plexus. It exists to the greatest extent between the cerebral plexus (internal granular layer) and the basal plexus (external granular layer).

At the same points and in the same regions of the retina, there exists a considerable extravasation of blood globules.

The vessels are affected by a very pronounced degeneration which assumes the hyaline form, or that of fibrous peri-arteritis, the adventitious membrane being much thickened, and sending off prolongations which blend with the surrounding connective tissue. Their caliber is considerably diminished, some appearing obliterated. The capillaries are dilated and engorged.

Optic nerve: No excavation. No lesions of the sheaths or tissue of the nerve. The central artery is affected by hyaline degeneration of all its layers.

Iris: The vessels are dilated, but present no degeneration. The iris angle is free, and the canal of Schlemm is permeable.

Obs. IV. *Clinical Examination.*—Woman, 81 years of age. (The antecedents are not specified in this very old observation found in the archives of the laboratory).

The patient in 1852, at the age of 52 years, had an attack of hemiplegia of the right side consecutive to a cerebral hemorrhage.

In 1871, had visual troubles of the right eye which increased to such an extent that, in 1873, she was received into the Quinze-Vingts as blind. At this time, O. D., = absolute glaucoma; O. S., ball atrophic following an injury. The patient died from pneumonia in 1881, and the right eye was enucleated and preserved in the laboratory.

Histological Examination. Slide No. 377.—Choroid: The vessels much dilated, giving the membrane a thickness greater than normal. There exists infiltration of leucocytes.

Retina: This membrane has undergone nearly complete degeneration which renders it unrecognizable in many places. It is a sort of necrosis of the several layers. It is distinguished, however, that the vessels have undergone hyaline degeneration with considerable thickening of their walls. At all points where the membrane is still preserved, some vacuoles are recognized.

Optic nerve: Nothing abnormal in appearance. No excavation. (The anterior segment of the globe was lacking in the specimen).

This observation is especially interesting in showing the relation between retinal hemorrhages and hemorrhagic glaucoma on the one hand, and on the other, vascular alterations susceptible of occasioning cerebral hemorrhage.

If we look over our observations, it will be noticed that certain lesions are absolutely constant, viz., those of the retina. The alterations of the uveal tract and the optic nerve which constitute the basis of irritative glaucoma, either chronic or acute, are more variable.

We constantly find in our specimens and in all published observations on true hemorrhagic glaucoma, at first sight, and in first rank, a profound hyaline or fibrous degeneration of the retinal vessels. The vessels of the choroid and iris are affected less regularly.

In the second place, we have found in all the cases we have examined, the existence of retinal vacuoles more or less large, and filled with fibrinous exudates or empty.

These vacuoles constitute a degenerative lesion that is but the consequence of primordeal vascular alteration. They are analogous to the vacuoles found in all brains of atheromatous old people, and similar also in pathogeny to the well-known dilatations which Ivanoff has described as occurring in the peripheral parts of the retina of old people. They naturally accompany the hyaline degeneration of the vascular system of the retina.

The hemorrhages of the retina are found also most frequently in the specimens of hemorrhagic glaucoma, but their existence is less constant than the alteration of the vessels which is necessary to the production of the disease. The absence of these hemorrhages may be taken as evidence of the oldness of the lesion, having become reabsorbed or undergone fatty or cystoid degeneration.

We have not found in our specimens the miliary aneurisms pointed out by Liouville, and mentioned in the thesis of Hache. These lesions may be present in hemorrhagic glaucoma, but as being a form of vascular degeneration they are evidently less regular than the hyaline or fibrous transformation.

Less constant, as we have said, are the lesions of the uveal tract.

The choroid presents in some cases an inflammatory infiltration. Its vessels ,as well as those of the ciliary body, may be found dilated, the dilatation being passive, and filled with blood. Sometimes, as has already been noted by Pagenstecher, this membrane is absolutely healthy and presents vascular alteration. This contrasts, absolutely, with the state of the retina. The iris presents the same lesions as the choroid, except that its vessels seem more disposed than those of the choroid to undergo the degeneration which affects in the greatest degree those of the retina.

But it is important to notice that the adhesive obliteration of the iris angle and of Fontana's spaces, which is one of the characteristic lesions in acute or subacute irritative glaucoma, is not constantly found in our specimens of hemorrhagic glaucoma. Where it does exist, it seems to be the result of increasing irritation of all parts of the globe and not a cause of these symptoms.

There are seen the same alterations in the posterior pole of the eye at the optic nerve. The posterior filtration channel of the eye undergoes no more constant change than the anterior in cases of hemorrhagic glaucoma, as is shown by examination of the slides. Thickening of the sheaths is not the rule, and more than once, also, in some old cases, excavation had taken place. These details have elsewhere been noted by various authors, and especially in the first cases published on hemorrhagic glaucoma by Pagenstecher.

On the whole, if the ascertained lesions are relied upon, hemorrhagic glaucoma is, following the expression of Poncet, a disease of retinal origin rather than an affection, proper, of the uveal tract, as is irritative glaucoma.

It is important to note, and as a fact very important, that in all the patients that formed the subject of our observations there existed a generalized affection of the cardio-vascular system, arterio-sclerosis most frequently. In one of them the cardiac defect had been ascertained by auscultation, and in observation No. IV, which lacks the entire clinical history, we find noted the fact of an old hemiplegia, which allows but little doubt of an alteration of the circulatory tree.

When we consider these lesions in hemorrhagic glaucoma, and those which have been studied so fully in irritative glaucoma by Priestley Smith, Knies, Wecker, Manfredi, on one side, and by Stilling, Laqueur, Mauthner and others, on the other, we are led to admit that there operate two very different morbid entities, and that they should not be placed in the same chapter in our classic treatises.

These affections have only one point in common; they may both end in progressive hardening of the ball with the particular disorganization of all the tissues which characterizes absolute glaucoma. But otherwise, all is different. In ordinary glaucoma it is the outlets of the nutritive fluids of the eye that are affected. Its behaviour is that of an affection entirely local. In hemorrhagic glaucoma, it is the retinal vessels that are diseased, participating in an alteration, more extended, of the general circulatory system; it is a general disease in which the eye participates. The result is that the affection of the eye admits a prognosis and treatment entirely different from those that appertain to simple or irritative glaucoma. It appears, then, that this should suffice to seperate, completely, hemorrhagic from ordinary glaucoma.

It is well understood, however, that when hemorrhagic glaucoma occurs there is comprehended under this name only the cases which truly deserve it; that is to say, those in which *the disease commenced by retinal hemorrhages more or less numerous, and in which, after an interval more or less prolonged, there* *occurs either progressive hardening of the globe, or repeated attacks of glaucoma.*

It is improper to include as belonging to hemorrhagic glaucoma cases of effusion of blood into the vitreous, or even retinal hemorrhages occurring in a glaucomatous eye from traumatism, or spontaneously.

In a recent thesis on the subject of hemorrhagic glaucoma, one of my pupils, Dr. de Bourgon, reports a fine example serving to establish the preceding point. It occurred in a patient, seen by Chevallereau at the Quinze-Vingts who was suffering from rather painful glaucomatous paroxysms in the right eye, the tension was raised, the visual field contracted; there existed a papillary excavation; therefore, an ordinary glaucoma Following a sclerotomy, there was found to be a retinal hemorrhage above and below the macula, which, however, disappeared in a few days.

In this case the hemorrhages constituted an inconstant, pathological incident which depended upon the consecutive alteration of the vessels of the glaucomatous eye. They were accidental; this eye was not affected by hemorrhagic glaucoma. In true hemorrhagic glaucoma, the hemorrhages open the scene. It is by putting together dissimular facts that the descriptions of hemorrhagic glaucoma have often lacked clearness.

Once more, the idea that hemorrhagic glaucoma is a special affection, in evolution always identical, and in prognosis peculiar, has been known and established through the labors of Pagenstecher and the works of Liebreich and of Von Graefe. Our teacher, Professor Panas, absolutely confirms this view in his lectures on the affections of the deep membranes of the eye. That which we desire to do to-day is to come back to this question, badly presented, to our mind, in accepted treatises, and support it with some observations.

Therefore, how shall the appearance of hemorrhagic glaucoma be interpreted?

It is probable that the increase of tension of eyes affected by hemorrhagic glaucoma depends, essentially, on mechanical obstruction sustained by the whole of the ocular circulatory apparatus.

The arteries have undergone a profound degeneration which occasions a considerable impediment to the circulation; the veins, under the influence of obstacles, become dilated and present the phenomena of thrombosis. fine examples of which are shown in our specimens, principally on level with the ciliary body and iris. The consequence of circulation-obstruction is, on the one hand, the formation of retinal hemorrhages produced ether by diapedesis, or by rupture of the walls in case of miliary aneurisims (which is most rare); on the other hand, the production of a serous exudation which progressively increases the ocular tension up to the point of producing painful symptoms.

The finding of sero-fibrous exudates in the cavitics of the retinal vacuoles gives the idea of the mode of production of these exudates.

Finally, in order to explain the sudden glaucomatous explosion and to interpret certain details in our histological specimens, the old hypothesis of Weber should still be considered. This author believed that the venous dilatations in the ciliary body, produced by a general cardio-vascular affection, occasioned the occlusion of the iris angle by the swelling of the ciliary body and was thus the direct cause of the glaucomatous attack. This explanation, which cannot apply to the majority of cases of ordinary irritative glaucoma, accords exactly with the real facts in hemorrhagic glaucoma.

And, in this manner, more or less directly, the progress of hemorrhagic glaucoma is dependant upon a generalized affection of the cardio-vascular system, and, as I believe, in the immense majority of cases this is arterio-sclerosis.

We do not wish to extend this paper further, as it is only a study in pathological anatomy and pathogeny; but it is to be conceived without hesitation that, alone, this pathological notion of the affection determines the prognosis and proper treatment.

It is known that irritative glaucoma is generally curable at its beginning, but this is not so of the early glaucomatous symptoms which occur in an eye affected with retinal hemorrhages. Here, increase of tension depends on the existence of lesions that can be but little influenced, permanently, either by sclerotomy or iridectomy, and the want of success of various treatments, and also the accidents of hemorrhage which may follow them, is not surprising, if the anatomical state of the vascular system of the eye in these patients is remembered.

Hemorrhagic glaucoma is a local affection which is but the expression of a particular general condition· To combat it, it is necessary to apply appropriate general treatment.

I will conclude this study by saying that true hemorrhagic glaucoma is not truly a glaucoma, and that the error of this designation leads to prejudical errors in regard to treatment.

EXTRACTION OF STEEL FROM THE EYE WITH THE ELECTRO-MAGNET,

By E. M. MARBOURG, M.D.,

Ophthalmic and Aural Surgeon to the Denver and Rio Grande R. R.,
Colorado Fuel and Iron Company, etc.

Pueblo, Colorado.

Following the article by Dr. Hubbell upon the electro-magnet, in the "*Record*" of February 1893, this case will no doubt be of interest.

On February 4th, 1893, Mr. M. was referred to me by Dr. Armstrong, to have a piece of steel removed from the interior of his eye. The patient, a laborer upon the A. T. & S. F. R. R., was struck in the right eye by a piece of steel, while engaged in setting in a new rail, which piece of steel had entered the eye. Upon examination, I found a triangular piece of steel lying in the temporal side of the posterior chamber of the eye, and partly in the pupillary space.

The steel had entered through the nasal side of the cornea about two millimetres from the cornea-scleral margin, the cut being vertical, and about four millimetres long. The piece of steel passed through the cornea across the anterior chamber, thence into the posterior chamber, the base being in the pupillary space. The lens was pushed aside by the foreign body. Cocaine being used, I introduced the straight point of the electro-magnet and in an instant, the steel had attached itself to the point. The magnet was now withdrawn with the steel adherent. Just as the steel emerged from the eye, there was a gush of aqueous, and the iris prolapsed into a wound. This I reduced with a spatula, giving the patient a good round pupil. The lens was uninjured, the only injury to the eye being a slight abrasion of Descemet's Membrance by the steel as it entered. Eserine was then instilled and the anterior chamber readily refilled. There was no inflammation at any time except that attending the corneal incision, as the steel was removed within an hour after the accident. The patient was discharged as well, within a week, with $\frac{20}{30}$ vision.

This case was one in which the use of the electro-magnet was imperatively demanded, as from the position of the piece of steel and its shape, the grasping of it by forceps would cause an injury to the capsule of the lens with ensuing traumatic cataract, or the sharp point of the steel to penetrate the ciliary body close to which it had lodged. As it was, the magnet was simply placed in contact with the steel, and was withdrawn like a sword from its scabbard, through the corneal wound. The piece of steel measured six millimetres long, one and one-half millimetres thick, and four millimetres broad, being triangalar in shape and with ragged edges. Its weight was 8 centigrammes.

AN ELECTRO-MAGNET FOR THE EXTRACTION OF STEEL FROM THE INTERIOR OF THE EYE.

By ALVIN A. HUBBELL, M.D.,

Professor of Ophthalmology and Otology in the Medical Department of
Niagara University; Surgeon to the Charity Eye, Ear and Throat
Hospital; Ophthalmic Surgeon to the Buffalo Hospital
of the Sisters of Charity, Etc., Buffalo, N. Y.

Several forms of the electro-magnet for the extraction of steel from the interior of the eye have been offered to the profession during the past fifteen years, and among them, one which was made for me in 1884, and published in 1888.* This magnet has, at my suggestion, been recently improved somewhat by, Geo. Teimann & Co., of New York; and as it seems to me to possess certain superior advantages I venture to call the attention of the prfession to it again.

In its new form the core is solid, soft iron, instead of a bundle of wires, and the connecting-posts are enclosed in a hard-rubber mould which carries a device or slide by which the electric circuit may be closed when the magnet is being used, and opened when not being used. The insulated wire surrounds the core in eight layers, and this coil is encased by a light, hard-rubber jacket.

Some of the extension-points have been squared or flattened at their ends by which more surface of contact is presented, and their holding power increased. The accompanying cut gives an excellent representation of the magnet and extension-points in actual size as now manufactured by Geo. Tiemann & Co.

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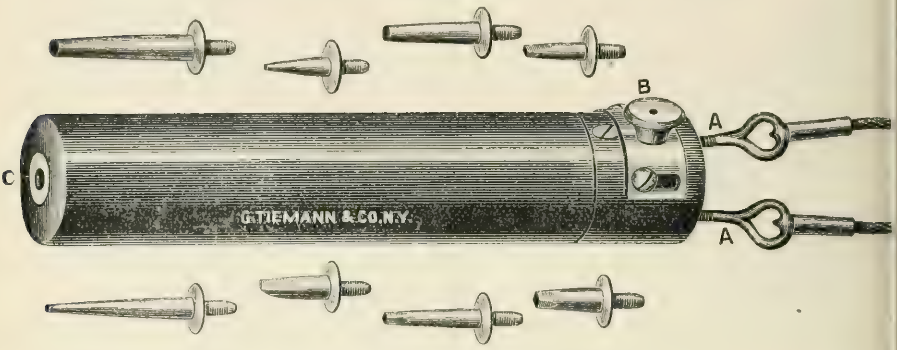
* Buffalo Medical and Surgical Journal, July, 1888.



ELECTRO–MAGNET, ACTUAL SIZE.

A. A. Ends of cords connecting the magnet with a galvanic battery. B. Slide for opening and closing electric circuit. C. End of core tapped to receive the extension-points. The extension-points, a few of which are shown, may be of any desired length, shape, curve or size.

The instrument is $3\frac{1}{2}$ inches in length, including the connecting-posts, the body being $2\frac{7}{8}$ inches long; it is a little less than $\frac{3}{4}$ of an inch in diameter; and it weighs $3\frac{1}{4}$ ounces. In power of attraction it seems equal to that of the original one which, when connected with an ordinary, single, quart cell battery, was found by careful tests to suspend 31 ounces of iron with an extension-point $\frac{1}{4}$ of an inch long (measuring from the face of the magnet) and $\frac{6}{32}$ of an inch in diameter at its end; 28 ounces, with one $\frac{1}{2}$ of an inch long and $\frac{5}{32}$ of an inch in diameter; 24 ounces, with one the same length and $\frac{4}{32}$ of an inch in diameter; and 18 ounces, with one the same length and $\frac{3}{32}$ of an inch in diameter.

The power of attraction diminishes very rapidly as the size of the point is lessened, or its length increased. Therefore, in using the magnet, as short and large an extension-point should be selected as is consistent with the case in hand. The length need never exceed $\frac{3}{4}$ of an inch. The points may be curved or straight and of any shape desired.

The electric circuit should always be opened by pushing the slide towards the end receiving the connecting-wires when the magnet is not being used, as the current heats the wire of the coil, if allowed to pass too long. The magnet can be used with any galvanic battery by not turning on too strong a current, but the manufacturers supply a cell suitable for the instrument.

The size, shape and lightness of this magnet, the form of its extension-points and their close proximity to the coil, and its great power of attraction render it most convenient and reliable, and commend it, it seems to me, to the purposes for which such an instrument is desired.

212 Franklin Street.

OPHTHALMIC SECTION OF THE AMERICAN MEDICAL ASSOCIATION.

The time for the annual meeting of the American Medical Association (June 6 to 9 at Milwaukee, Wis.) is so near at hand that all members who wish to contribute papers must send the title of their paper to the Secretary before April 25, in order to have them appear in the general programme and in order to make the arrangements for discussion. It is also urgently requested that brief abstracts be furnished not later than May 15, in the form in which authors wish them to appear in the preliminary report of the meeting. The announced communications as well as the names of those who have promised to attend assure the success of the next meeting. In view of the historical interest, which the Columbian celebration lends to the meeting, it is highly desirable that American Ophthalmology should be well represented by the names and presence of those who have contributed to its present advanced position.

S. D. RISLEY, M.D., Chairman, 1722 Walnut St., Philadelphia.
H. GRADLE, M.D., Secretary, 65 Randolph St., Chicago.

[For list of papers promised see next page.—Editor.]

LIST OF PAPERS PROMISED.

1. J. H. Lydston, Chicago. "Pannus and its treatment by digestive ferments."
2. C. Williams, St. Paul, "Hypertrophic Conjunctivitis and its treatment."
3. C. B. Blubaugh, Parkersburg, W. Va., "Treatment of Granular Eyelids."
4. D. S. Reynolds, Louisville, Ky., "Phlyctenular Ophthalmia."
5. I. Schneider, Milwaukee, "Some rare forms of Tumor of the orbit and eye-lids."
6. L. S. Zeigler, Philadelphia, "Rapid dilatation of the lach. sac.
7. H. Gradle, Chicago, "Commentaries on Diseases of the Lachrymal Passages."
8. C. A. Oliver, Philadelphia, 1 "Successful Extraction of Steel from the vitrious by Electro-Magnet." (2) "Study of a case of Hemorrhagic Glaucoma, with Microscopic Sections."
9. L. F. Love, Philadelphia, "Glaucoma,"
10. G. F. Keifer, Lafayett, Ind., "A study of the Etiology of Blindness of pupils in the various State Asylums."
11. W. F. Coleman, Chicago, "The total correction of refraction errors"
12. S. C. Ayres, Cincinnatti, "Strabismus Convergens, when and how shall we operate?"
13. H. V. Wuerdeman, Milwaukee, "Cataract-lenses."
14. B. L. Milliken, Columbus, O. "Unilateral Neuro-retinitis, with report of cases."
15. Dr. Dowling, Cincinnati, "Some recent investigations in regard to Tobacco."
16. Dr. Hobby, Iowa City. "Sympathetic Ophthalmia—a clinical study—amblyopia."
17. H. B. Tiffany, Kansas City. "Skfn grafting in Malignancy of the eye-lids and orbit."
18. R. F. LeMond, Denver, Col. "Exostosis of the orbit."
19. G. M. Gould, Philadelphia. "Albinism of Eyes."
20. B. Alex Randall, Philadelphia. "The curvilinear Reflection of Weiss, as a prodromal sign of myopia".
21. G. E. de Schweinitz, M.D., and H. A. Hare, M.D., Philadelphia. Intraocular Injections of Various Antiseptics: an experimental enquiry.

Papers have been promised but titles not yet given, by Drs. Morrow, Sutphen, Gardiner and Carpenter.

To the Editor :

The following will appear in the January number of the New York Medical Times. This is probably the best opportunity we will ever have to strike a severe blow to the nostrum evil, which of late has grown so rapidly.

Prompt, united action will secure this much desired result if we will go to work on these lines vigorously without delay. Medical societies should discuss and agitate promptly. Numerous marked copies and reports should be sent to Congressmen and Senators, beside long and influential petitions from every locality.

In this fight we will have right, justice and the public good on our side, but will be vigorously opposed by the rich nostrum makers, and, with a few exceptions, by the press, as they make their money very largely by advertising secret remedies.

Remember what the farmers secured for pure butter by prompt and united action. A tax of twenty-five per cent. will drive the small nostrum makers out of the business, and seriously cripple the large ones :

TAX ON QUACKS.

The recent suggestion of the Secretary of the Treasury that the tax on alcohol be increased fifty cents per gallon in order to raise more money for the increasing expenses of the Government seems to have met with a favorable response in some quarters, and the question of tariff and taxation will no doubt be considerably discussed by Congress in the near future.

In this connection the wisdom of putting a heavy and permanent tax on all forms of nostrums and quackery will at once commend itself to all wise legislators who are working for the public good. A stamp tax of this kind, say twenty-five per cent., on every form of secret or proprietary medicinal preparation of any kind, whether sold by the retailer, proprietor, manufacturer, or by advertising quack specialists, would be no hardship to the public, as it would in no wise affect the retail price of these articles. All such manufacturers could easily afford to give the Government twenty-five per cent. of the retail price and still have a very handsome profit left, as their net profit is rarely less than five hundred per cent., and often very much more.

Legitimate preparations of the Pharmacopœia and other standard preparations where the complete working formula is public property should be exempt. But as the success of quackery depends on secrecy and mystery, and as these two conditions enable unscrupulous persons to get a dollar for a few cents' worth of a simple remedy, it will be seen that there would be no injustice to any one if a good fair tax were put on the business

If the Government went still further and required all nostrum and secret medicine manufacturers to pay a big license, and place on record open to public inspection a sworn statement of the exact composition, together with a complete working formula of each preparation, much good would result. And if, like insurance companies, they were also required to furnish heavy bonds or make a special deposit, which could be forfeited under proper restrictions, provided their medicine did not do all that was claimed for it, the public would be still better protected both in health and pocket, and no injustice would be done to the honest manufacturer of articles of real merit.

There is no good reason why the Government should not place the nostrum business on the same basis in its Internal Revenue Department as the manufacture of whiskey and tobacco. Analyses of these preparations should be made from time to time, and heavy penalties imposed if they vary from the sworn formula on record, or if any dangerous drug like morphine is being used.

England, which is said to be a free trade country, taxes the nostrum business heavily, and derives a large and growing revenue from that source.

ARISTOL.

Of the many substitutes for iodoform which have been brought forward during the past few years only two have stood the test of clinical experimentation—Aristol and Europhen. The qualities which render Aristol an effective substitute of iodoform are, in brief; freedom from disagreeable odor, absence of poisonous effects, antiseptic and adhesive properties, ability to produce rapid cicatrization. In fact we find combined in this one remedy all the qualities necessary to constitute a perfect antiseptic dressing. The range of utility of Aristol has so greatly extended that it is now an indispensable article in the surgical armamentarium.

Dr. Daniel Lewis [Med. Record] has found a preparation of Aristol in flexible collodium of great value in erysipelas in its early stages and as a dressing of cancerous ulcers regards the pure powder or an ointment with vaseline as superior to iodoform or any of the other preparations usually employed for the purpose of checking suppuration. Dr. Crile, of Pittsburgh [Times and Register, Dec. 5, 1892], warmly praises the action of Aristol as an antiseptic and cicatrizant in his surgical work, which he regards in every way preferable to iodoform. In ophthalmology Aristol has also proved its value. Dr. James A. Wallace, [Therapeutic Gazette] has successfully employed it in interstitial Keratitis. Drs. Bourgeosis, Vigries, and Hegg, [Wien. Med. Presse] in the treatment of corneal ulcers. In diseases of the ear and nose especially of tuberculosis and syphilitic character, Prof. Burkner, [Berlin. Klin. Woch., No. 26, 1892] has obtained surprising results from the use of Aristol and his testimony is confirmed by Drs. Heymann, Pini, Szenes, Braislin [Brooklyn Med. Jour.] and others. Satisfactory evidence is also at hand in cases of pulmonary tuberculosis and this method of treatment suggested by Nadaud [Tribune Medicale] and followed by Dr. R. da Silva [Soc. de therap. a Paris, Feb. 10, 1892] is certainly worthy of further trial.

Department of Otology, Laryngology and Rhinology.

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THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY, WEDNESDAY EVENING, FEB. 22, 1893.

CHAS. H. KNIGHT, M.D., CHAIRMAN.

Dr. Joseph W. Gleitsmann presented a number of rhinoscopic mirrors with curved handles, which he stated he has found to be decidedly superior to the ordinary straight mirror.

Dr. William K. Simpson presented a case of enlarged tonsils occurring in the course of secondary syphilis. The patient, a male, became infected with syphilis, the initial lesion appearing four months ago. The secondary symptoms were not severe. A week ago the man began to have pain in the throat, with enlargement of both tonsils. An examination showed that both tonsils were very much enlarged; very pale in appearance, and almost meeting in the median line. They were covered with mucous patches. The inflammation was not acute. It was not deemed advisable to remove the tonsils on account of the possibility of setting up a syphilitic ulceration. Under antisyphilitic treatment and a gargle of black wash, the tonsils have already considerably decreased in size and improved in appearance.

Dr. James E. Newcomb said that he has under observation a German woman, about 20 years of age, with a specific history. She had enlarged tonsils, with mucous patches on them. The throat symptoms were not very severe. Under appropriate internal treatment, the tonsils shrank considerably in size, the right one practically becoming normal. The left one, however, remained large and was removed with the snare. Rather severe hemorrhages followed the operation. The usual large slough appeared, but the wound healed up as quickly as if there has been no specific history. The patient has since remained well. She had been under observation and treatment for some months before the surgical procedure was undertaken.

Dr. Charles H. Knight, the Chairman, stated that he thought Dr. Simpson had pursued the proper course in abstaining from operative interference in his case. The effect of specific treatment is often quite as decided in syphilitic hypertrophy of the tonsils as in other manifestations of the disease. Whereas it is a recognized fact that injuries and surgical wounds sometimes behave badly during the active stage of syphilis.

IDIOPATHIC GANGRENOUS GINGIVITIS IN ADULTS:

Dr. George A. Richards read a paper on this subject, and gave the history of two cases coming under his observation. The first case was that of a man, aged 50, a chef by occupation. The patient had had a severe attack of rheumatism, lasting about two or three weeks. For a week before coming under observation he had been feeling considerably better, but he was rather weak and noticed that his mouth was sore, associated with marked salivation. His appetite was poor. The putrefactive odor was marked. The patient was prostrated; his face was pale and somewhat swollen. An examination of the mouth showed the entire alveolar portion of the lower jaw to be in a sloughy condition, the tissues being dark brown or black in color. The gums had fallen away from the teeth, and portions of the alveolar process of the inferior maxilla were visible. The teeth were loose. The alveolar process of the upper jaw was involved in the same way, but to a lesser extent. The parts were bathed in a sanious, very fetid discharge, containing shreds of necrotic tissue. The tongue was dry, brown and cracked; the pulse rapid and very feeble and the patient in a condition of low muttering delirium. A strong deodorizing and antiseptic solution of listerine, potassium, chlorate and carbolic acid was ordered as a mouth wash, and he was given vigorous stimulation. He steadily failed, however, and died twenty hours later. No evidence of the administration of mercury or other metallic poison was found. For the rheumatism he had been given small doses of potassium iodide in a tonic mixture.

The second case reported was that of a male, aged 34, a lawyer. He had a chancre 15 years ago; no secondary symptoms. Two weeks before he had had an attack of sore throat (apparently tonsillitis) not very severe. From this he recovered. One week ago he took a Turkish bath, from which he thought he contracted a cold. In five or six days his mouth became very sore and a lump began to form below the angle of the jaw. His appetite was poor and he felt very weak. When the patient came under observation he was in a condition of marked prostration, emaciated, the skin of an ashy pallor. His breath was very fetid. On the right side of the hard palate, just inside the alveolar process and opposite the molar teeth there was a sloughy, gangrenous spot, extending externally to the gingivo-buccal reflection. There was a similar spot on each side of the molars of the lower jaw. Temperature, 102.2; Pulse 110; respiration, 24. Urine acid: specific gravity, 1020; contained a trace of albumen and numerous casts. A mouth wash of bichloride of mercury was ordered. Within a short time the breathing became labored, moist rales were heard all over tne chest; the patient steadily failed and died thirty hours later.

Dr. Richards said that while cases of noma affecting children have been observed and reported in large numbers, medical literature contains comparatively few cases of gangrenous inflammation involving primarily the gums of *adults*. In most of the cases reported, the patients appear to have had no previous illness. This is not so, however, in the two cases reported above, and it would seem necessary that the resistance of the tissues to morbid agents should be below par. In noma, bad hygiene seems to be a powerful predisposing cause. In this affection, such causative relation is conspicuous by its absence. Almost invariably, the local symptoms are the ones which first strike the attention of the patient or his attendants. Hemorrhages occasionally occur during the course of the disease, but rarely of any severity, although they may be serious enough to endanger life, and in one case reported by Byrd, ligature of the common carotid was deemed necessary. As the process extends, perforation of the cheek or lip may occur. In some cases, the entire side of the face may be involved. The teeth become loosened, and drop out one by one, and if the patient lives long enough, portions of bone from the inferior or superior maxilla may be thrown off.

Dr. Richards referred to the points of resemblance between gangrenous gingivitis and noma, scurvy and purpura. The intense prostration accompanying the trouble he believes to be due to the absorption by the stomach or lungs of poisonous ptomaines, the result of the growth of bacteria. Of nine cases reported, only one recovered. In noma the mortality is estimated at 75 per cent.

In both noma and gangrenous gingivitis, caustics have been faithfully employed as a method of treatment, with but little success. Silver nitrate, however, was used in the only successful case reported—that of Berkley, although the patient would probably have recovered under the simple supporting treatment given in addition. The greatest possible cleanliness is of the first moment. Strong solutions of bichloride of mercury (1-480 to 1-1000) carefully rubbed into the affected parts several times daily and also bismuth have been recommended; a combination of the two would probable prove valuable. The use of tincture ferric chloride is recommended by all writers. The main reliance, however, must be placed on diet, stimulation and nursing; good nourishing food in abundance and whiskey to any amount necessary.

Dr. William H. Park gave the history of a case of noma that recently came under his observation. The patient was a child two years old suffering from marasmus. A dark spot first appeared at the central portion of the lip below the gum. Two days later the tissues of the lip about the sore assumed a dark appearance. There was no swelling. Temperature 100. Perforation and sloughing of the lip followed, and in eight days the child died. Cultures and sections of the invaded tissues showed that they were permeated with streptococci. There seemed to be a general infection of the body from that central point. Bichloride of mercury has been employed as the method of treatment.

Dr. Richards said that he has met with three cases of noma following typhoid fever: two of these proved fatal. The ages of the patients were, respectively, 7, 10 and 13 years. Bichloride of mercury was used, and, in addition, iodoform gauze was packed into the affected tissues.

CONCLUSION OF DISCUSSION OF PAPER BY DR. MYLES, ON DISEASES OF THE ACCESSORY SINUSES.*

Dr. J. W. Gleitsmann, in taking up this subject, said that in this country we do not perform the operation of opening the accessory sinuses as frequently as they do in Europe. For this reason, he was glad to hear Dr. Myles outline his method of treatment. The speaker referred to the work of Dr. Schæffer, of Berlin, in this branch of surgery. As to the value of transillumination in establishing a diagnosis, Dr. Gleitsmann said he agreed with the views expressed by Drs. Bryan and Allen, namely, that it was a very valuable test, but not an infallible one. In antral disease, Dr. Grünwald, of Munich, lays great stress upon the value of the outflow of pus following irrigation as a diagnostic sign. When the patient objects to the operation of entering the antrum through the alveolus or canine fossa, very good results can be obtained by perforating the outer wall of the cavity below the inferior turbinated by means of the trocar devised by Mikulicz. The opening thus made, however, is not at the most dependent portion of the antrum, and we do not get as thorough drainage as when we enter through the alveolus or canine fossa.

Dr. Gleitsmann said that he has seen a fair number of cases of ethmoidal sinus disease, generally complicated with polypi. Some writers claim that with pus in the nasal cavity we must have accessory sinus disease. It is often a matter of much difficulty to ascertain which sinus is diseased. By following up the track of the pus with a probe, we may find necrotic bone. The speaker then gave the history of a number of cases of frontal and sphenoidal sinus disease coming under his observation. In opening the sphenoidal sinus, he followed the plan laid down by Schæffer.

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* See Ophthalmic Record, March, 1893.

Dr. Wendell C. Phillips said that for the past two years he has been much interested in the line of work reviewed in Dr. Myles' paper. Of all the accessory sinuses, the antrum, perhaps, requires more frequent treatment than any other. He has felt for a long time that our dental friends looked upon disease of this cavity from a standpoint that led them somewhat astray. Garrison claims that a large percentage of the cases of antrum disease are due to diseased teeth. Dr. Phillips said he investigated this question two years ago, and came to the conclusion that Garrison was wrong, and that many such cases do not find their origin in the teeth. In one case that came under his observation about two years ago, referred to him by a prominent dentist, the patient had suffered from antrum disease, supposed to be of dental origin, for a number of years. Two of the teeth had been removed, and an opening made into the maxillary sinus. There was a free discharge of pus, but no necrotic bone was found. No rhinoscopic examination had been made. When he came under Dr. Phillip's observation, a large exostosis of the septum was found, projecting underneath the middle turbinated bone and making pressure on the ostium maxillare. This exostosis was removed. Various cleansing solutions were injected through the normal opening. The case rapidly recovered and there has been no recurrence of the disease. He agreed with the statement made by Dr. Myles that acute inflammatory conditions of the antrum were more common than many observers supposed them to be. A large proportion of the cases of so called facial neuralgia are really acute inflammations of the antrum· Dr. Phillips said he was rather surprised to hear that Dr. Myles found so many cases of polypoid degeneration in these sinuses. He was inclined to differ somewhat with the views expressed by the writer regarding this condition. He had no doubt it was present, but believes that in some of these cases, as time goes on, the patients will go from bad to worse and eventually die with sarcoma of the antrum. This cavity appears to be a favorite locality for osteo-sarcoma. Such a case recently came under his observation. The best location for entering the antrum he considers to be through the canine fossa, about on a line with the second molar tooth. It is simple and can be easily done. The patient should be placed in the dentist's position, with the head lying back on the chair. Dr. Phillips said he has entered the antrum from the nose by means of an instrument similar to that exhibited by Dr. Gleitsmann, but he found the opening unsatisfactory. In these operations, an anæsthetic is not required: the application of cocaine is sufficient. The pening made into the cavity should be large. He has discarded the use of a drainage tube, and believes that they do harm. When the patient eats, the opening can be covered over with a piece of cotton.

Dr. W. Freudenthal said that in doubtful cases of antrum trouble, he considered transillumination of great value. It is not, however, infallible. He referred to one case wherein a diagnosis of empyema on the right side was made, the electric light showing that side to be decidedly darker than the other. On attempting to enter the cavity through the canine fossa, it was found that no antrum existed on that side. Zuckerkandl reports two such cases.

Dr. Knight referred to the value of percussion as a diagnostic point in disease of the maxillary sinus. As regards operative procedures in sinus disease, the speaker thought there was danger in going too far in that direction. Many cases are prone to spontaneous recovery, provided we re-establish normal drainage through the anatomical outlet. Many cases of antral disease are due to obstruction of the middle meatus. Therefore, if we remove from that situation the hyperplastic or other abnormal tissue, and restore the drainage of of the cavity, recovery will usually follow without the necessity of making an artificial opening. Of course, where polypoid degeneration or degenerative changes in the bony wall of the sinus have taken place, as in cases of long standing, it is necessary to enter the cavity and provide for the relief of such conditions.

Dr. Simpson narrated the history of a patient who had an opening drilled into the antrum through the cavity of the first molar tooth. In order to keep this opening patent he was in the habit of introducing into it small pieces of tooth-pick or the whisk of a broom. A few days ago he had a fit of sneezing, and a piece of a tooth-pick came out of his nose. Some days later he passed in the same way a long piece of broom-whisk. A free drainage opening had been made through the middle meatus.

Dr. Richards gave the history of a patient who has recurrent attacks of frontal sinus disease.

Dr. Robert C. Myles then closed the discussion. He stated that his object in writing the paper was to bring out as far as possible, by means of the discussion, the present status of our knowledge in regard to diseases of the acessory sinuses and their treatment. As regards transillumination, while he does not consider it an infallible test, it is certainly a very valuable aid in making the diagnosis. In cases of frontal sinus disease, associated with polypoid degeneration, it is not difficult to enter the cavity through the infundibulum, as the bones have been rendered soft by the degenerative process. The majority of the cases reported in his paper, Dr. Myles said, were seen in private practice. In those with polypoid degeneration, when the frontal sinus was opened the polypoid mass would protrude like a hernia. The characteristic polypoid structure was afterwards revealed under the microscope. The speaker said that he has at present a patient under observation, a girl, who has an empyema of every cell in her head, excepting the left sphenoidal sinus. To perforate such a patient's head in every direction is rather a serious surgical procedure, but what else can we do? He believes the time is coming, however, when we can treat these diseased cells by means of proper drainage, and with very little danger to the patient. The speaker said he agreed with Dr. Phillips that the opening into the antrum should be made sufficiently large, and that no drainage tube should be employed. There are no doubt hundreds of cases of aecessory sinus disease that go undiscovered. They have periods of activity and latency, and are ofttimes treated simply as cases of nasal catarrh. Many cases of so-called consumption should have been diagnosed as cases of purulent infection, due to the continual dribbling of the discharge into the bronchi.

WENDELL C. PHILLIPS, M.D., Secretary.

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RYTHMICAL EXERCISE, THE PROPER METHOD OF DEVELOPING THE OCULAR MUSCLES.

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The development of the ocular muscles by means of gymnastic exercise has received but little attention from modern authors. Noyes devotes about one page to the subject; DeSchweinitz, less than one page; Schmidt-Rimpler, three lines as follows:— "No improvement is to be expected, as a general thing, from exercise of the interni; over-exertion, that is apt to occur, may result, on the contrary, in a serious impairment of their power;" Fuchs, not a line; Berry, not a line; Meyer, ten lines; Landolt, not a line; Wells, one paragraph of ten lines; Schweigger, not a line; Nettleship, not a line; Juler, not one word; Carter, not a line.

Those of the twelve authors above named who teach anything on the subject teach the same thing. This teaching is illustrated by the following quotation from DeSchweinitz:— "Thus to exercise the interni [in exophoria] a prism of 10 degrees is placed base out before one eye, and as soon as the diplopia produced is overcome, 5 degrees more are added, and so on until the limit of adductive power is reached. * * * These exercises should be repeated every day for 10 or 15 minutes at a time, until the patient has acquired the power to overcome readily a prism of 50°. He recommends the same character of exercise for developing the externi, beginning with a 3° prism and increasing to 8°.

Noyes, following Dyer who wrote on this subject in 1865, says:— "He [the patient] takes a candle flame or door knob at 20 feet for his object, and performs the efforts of adduction and abduction by means of these prisms. He begins, say with adduction, and at first holds the prism of 5°, with base out, before one eye, then substitutes the 10°, then before the other eye places 5° making a total of 15°; then if practicable substitutes the other prism of 10° for the 5°, and so climbs up the ladder of adduction prisms by such steps as he can make. If the interval of 5° becomes too great, he may take that of 2½°". He speaks of the exercise of the externi after the same plan, using weaker prisms with their bases in. He directs that this exercise be continued 10 minutes at each sitting and that it be repeated not oftener than twice a day, until, in the case of the interni, a prism of 42½° can be readily overcome, and, in the case of the externi a prism of 10°. The prism of maximum strength having been reached its use should be continued, says this author, once daily for a time. Noyes closes by saying: "A decided gain in comfort and use of the eyes may be obtained by this proceeding, and if this result is not adequate, the true state of the muscular relations is brought to view."

It is not necessary to make further quotations in order to bring clearly into view the character of the exercise. It is the object of this paper to show that the plan is unsound in principle and must necessarily be unsuccessful in practice. Continuous muscular contraction, augmented at short intervals, for 10 minutes, or for even 5 minutes, may show what a muscle is capable of doing in an emergency, but it is not calculated to build up or develop the inherent power of the muscle.

In a modified form Dr. Chas. E. Michel, of St. Louis, has persistently practiced the development of weak internal recti muscles by means of prisms, since 1877. The prisms used by him have not been stronger than 4° nor weaker than 1°. Beginning with the weaker prism he directs the patient to exercise frequently (10 to 15 times) during the day, each period of exercise to last only 4 or 5 minutes, for the first few days; later they are to be worn only 4 or 5 times daily, increasing the time of exercise by 2 to 5 minutes daily until they can be worn comfortably one hour. When the patient, looking in the distance, becomes able to wear the 4° prism one hour without discomfort, he is directed to commence reading. At first he must read only 3 to 5 minutes at a time, but later increases this time by 2 to 5 minutes daily until he can read comfortably one hour, four times a day. Whenever this can be done the patient is directed to continue, for several months, the reading exercise practice for half to one hour, two or three times a day. To suit individual cases modifications, as to strength of prism and length of time and frequency of exercise, must be made.

Under Dr. Michel's treatment fully 60% of his patients have full muscular power developed, and in this way are enabled to use their eyes with comfort; 25% have greater or less gain in comfort, while 15% derive no benefit from the treatment. As a preliminary step to the muscle treatment the Doctor always corrects any existing refractive errors, and has the patient wear these lenses behind the exercise prisms.

Dr. Michel's method of developing ocular muscles is given for the reason that it differs essentially from that set forth in the books; and for the additional reason that a high percentage of cures results from his method. The Doctor's success has been due to the fact that his weak prisms used made but little demand on the weak muscles, thus making it possible for the continuous contraction to be borne and the muscle strengthened.

In contrast with Dr. Michel's practice, the method of Dr Geo. T. Stevens, of New York, is here given in his own words: "Adduction may be greatly improved by gymnastic exercises of the interni by means of prisms. In these exercises the eyes are required to unite images in overcoming gradually increasing obstacles. A prism of a few degrees, perhaps 10°, is placed, base out, before one of the eyes, while gazing at a lighted candle at twenty feet distance, when an effort is at once made to prevent diplopia. As soon as the images are blended, another prism, of perhaps less degree, is placed in the same manner, the images being united a stronger prism takes the place of one of those already in place, or one is added to those already in position. Thus, little by little, the eyes are required to overcome prisms until the images can no longer be united. Then all the glasses are removed and the process is repeated; with each repetition something may be gained. The exercise should not be continued at a single sitting more than 5 or 6 minutes, and only a single sitting daily is desirable. By this means the adducting power can, in most cases, be raised after a few exercises to the desired point.

"The effect of such exercise upon the eyes is very often extremely salutary. With greater freedom of muscular action comes a sense of relief from nervous strain, which is often of a most gratifying character. Such an exercise is in no way related to the practice sometimes adopted, and which should be condemned, of requiring the patient to gaze for a long time at a near object."

The virtue of Dr. Michel's method lies in the fact that, though he taxes the muscles for a long while, gradually reaching the maximum of time, he taxes them but slightly, using only weak prisms; while the virtue of Dr. Steven's method lies in the fact that, while he taxes the muscles severely, using the strongest prisms possible, reaching the maximum strength by degrees, he does not continue the exercise very long and does not repeat the sitting again the same day. And, too, he almost strikes the right principle in his method of intermitting the exercise.

In contrast with both of these methods, and with the method laid down in the books, the method of

RYTHMICAL EXERCISE

will now be given, the author feeling confident that it is founded on sound principles and that it can, therefore, be carried out successfully in practice.

Contraction and relaxation, alternating in short and rythmical order, and continued short of fatigue, is the kind of exercise that *develops* a muscle, in any part of the body. It is the alternate contraction and relaxation that develops the muscles of the arm of the blacksmith. If the forearm should be flexed on the arm and held in that position 10 minutes no one would suppose that the muscles concerned could be developed thereby. There would be greater reason for believing that such action would enfeeble the muscles. This is precisely the kind of contraction effected by prisms in the old method of exercising the recti muscles. There can be no wonder that better results have not followed, and that the practice has been abandoned by almost all oculists.

This paper would be of little worth if it condemned the old practice as bad without setting forth a new line of practice, based on sound principles, and one that must be successful, in suitable cases.

While rythmical contraction and relaxation, regulated as to intensity and time, will develop any one of the recti muscles, as is developed the biceps of the blacksmith, the writer would not be understood as believing that one of these muscles can be developed out of a *low* state of weakness into a *high* state of strength. There are cases of Exophoria that will remain exophoric still in spite of long continued rythmical and graduated exercise; and these cases to be cured at all must be cured either by partial tenotomies alone or by these supplemented with rythmical exercise. The same may be said of Esophoria and Hyperphoria. Only low degrees (not more than 6°) of lateral heterophoria can, by rythmical exercise alone, be converted into orthophoria; the highest degrees can be corrected by partial tenotomies, shortenings and exercise combined. While, in suitable cases, the aim of partial tenotomies and shortenings should be to approach orthorphoria, yet the greatest care should be exercised not to go beyond the "balance" line. The safest thing is to leave, for correction by exercise, some of the original condition.

In attempts to develop the ocular muscles after the rythmical contraction and relaxation method, it must not be forgotten that the extrinsic muscles of the eye are under the control of the guiding sensation in the retina, through the will.

Any one of the recti and either of the obliques weaker than its opposing muscle, the difference in corresponding strength not being too great, may be developed by rythmical exercise, into a state that will enable it to work harmoniously with its fellow.

EXOPHORIA.

Exophoria may be taken first for study. The quantity should not be more than 6°. The internal recti are the muscles wanting in strength. There are two plans of exercise, rythmical in their nature, by either one of which, or by both combined, these muscles can be strengthened:

1. The wax taper method;
2. The method by prisms, bases out.

The exercise by the taper (small wax candle) must be conducted as follows:— The patient is directed to light the taper and hold it arm's length from, and on a plane with, the eyes, immediately in front of the face. Fixing his vision on the flame he continues to look at it while he brings it slowly to within four inches of his eyes, holding it there about 2 seconds. He then closes his eyes for a moment, and on opening them he fixes his vision on some object, preferably the flame of a candle or lamp, 20 feet or more distant The same procedure is gone through with a second time, and so on for six to ten times at the one sitting. The sittings may be repeated two or more times daily for weeks or months. The best time for this exercise is early in the morning while the muscles are fresh from sleep. In many cases the morning sitting will be sufficient for the day; this is specially so if the exophoria is low in degree. Reading or other near work should not be done within the hour after exercise.

In this taper exercise no one can doubt that the guiding sensation compels the internal recti to contract as the light advances, the maximum of contraction being reached when the taper is four inches from the eyes. On closing the eyes partial relaxation of the interni occurs (keeping the eyes closed long enough the relaxation would become complete): the moment the eyes are opened and vision is fixed on a distant object, in quick response to the guiding sensation the relaxation becomes complete. Thus is brought about contraction and relaxation, which should be discontinued short of fatigue. That this rythmical exercise, properly regulated as to frequency and to force, will develop the internal recti, is susceptible of demonstration on the part of any one who wishes to know the truth.

The second method for developing the interni is by means of prisms bases out. The prisms to be used may be from ½° to 4°, and one should be placed before each eye. The treatment should be commenced with the weaker prisms; and, as development of the muscles advances, the stronger should be brought into use. The object looked at should be a candle, lamp or gas-jet, 15 to 20 feet distant. The prisms before the eyes, the image in each of the two eyes is displaced out, and the guiding sensation calls quickly into action the interni. After 5 seconds the interni must be allowed to relax for the same length of time (5 seconds), which is readily effected by lifting the prisms up and allowing the light to enter the eyes uninfluenced. The guiding sensation at once causes the relaxation to take place, so that the yellow spots may receive the images. At the end of this 5 seconds, the prisms are again dropped before the eyes and the interni again contract. Then a second time the relaxation is effected by lifting the prisms; and so on throughout every sitting which should last from two to ten minutes, but always discontinued short of fatigue. The sittings should be repeated two to five times a day. While it will take weeks if not months to establish orthophoria, never-the-less this end can be attained, in suitable cases, by this method. It will be better in most cases to resort to the two methods of development, the taper and the prisms, each day, but not at the same sitting.

In resorting to the prism exercise it would be more convenient to close the eyes, for the purpose of getting relaxation, than to lift the prisms. When the eyes are closed the relaxation is slow to take place, and is rarely complete at the end of sixty seconds, whereas, when the prisms are raised the guiding sensation effects, at once, complete relaxation which continues until the prisms are again placed before the eyes. The rythmical nature of the exercise is more perfect in the latter than in the former, and results are better necessarily.

ESOPHORIA.

In this condition the muscles to be built up are the external recti. There is but one method for doing this, and that is by means of prisms. These should be from ½° to 2°, certainly not more than 3°, and their bases must be placed in. Beginning with the weaker prisms the patient should look at the candle twenty feet distant, for 5 seconds, during which time the guiding sensation has caused the externi to undergo contraction: and then the prisms should be held up for 5 seconds to allow relaxation to take place. These steps should be thus regularly repeated throughout each sitting of 2 to 10 minutes, the sittings themselves being repeated from 2 to 5 times daily, as in treatment of exophoria. In suitable cases orthophoria can be brought about.

HYPERPHORIA.

Hyperphoria and cataphoria, like esophoria, are susceptible only to the exercise by means of prisms. Given a case of left Hyperphoria (right cataphoria) of not more than 1½° there is a possibility of developing vertical Orthophoria by means of rythmical exercise. The muscle on the left side to be developed is the inferior rectus and that on the right, the superior rectus. The prisms used should not be stronger than 1° for each eye; at first ¼° prisms should be used, and later ½° prisms. The base of the left prism must be up and that of the right down. As in Exophoria and Esophoria, the patient should exercise from 2 to 10 minutes at a time and 2 to 5 times a day. The object looked at should be twenty feet distant, and it should be seen through the prisms 5 seconds, then without the prisms 5 seconds, and so on throughout each sitting. Thus contraction and relaxation of the weak left inferior rectus and weak right superior rectus are effected in rythmical order. If the Hyperphoria is on the right ride (left Cataphoria) the base of the right prism must be up and that of the left down. In every form of hetrophoria the angle of the prism must point in the direction of the muscle to be developed by it.

Occasionally cases present themselves in which there is a general weakness of the recti muscles and especially of the external and internal recti, unaccompanied by general physical weakness. Such cases generally manifest Esophoria for distance and Exophoria in the near, neither muscle being able to overcome a prism of anything like the usual strength. To operate on such a case would be improper, since relief of the Exophoria in the near would be attended by a corresponding increase of the Esophoria for distance, and *vice versa.* In such cases the interni should be brought under the influence of the rythmical exercise, as already set for in our study of Exophoria, at one time of the day: and, at some other time of the day, like attention ahould be paid to the external recti, as in simple Esophoria. In these cases strychnia and electricity could be used with some promise of aiding the exercise treatment. Such patients should be allowed to undertake but little near work until the exercise treatment by means of prisms has become well advanced. In these cases the wax taper treatment of the internal recti is not applicable until late in the course. These cases are far more stubborn than cases of simple Exophoria and simple Esophoria, and yet great advantage can be derived from the rythmical exercise by means of weak prisms, aided by strychnia and electricity.

In cases in which the recti muscles are weak because of a low state of general health no treatment should be thought of except that intended for the well-being of the whole system. Use of the eyes in near work should be prohibited, until recovery of the general health has occurred.

CYCLOPHORIA.

The treatment of insufficiency of the oblique muscles, as set forth in No. 1 of the current volume of the *Ophthalmic Record*, is by means of cylindrical lenses (preferably convex), so placed as to lead the guiding sensation to demand contraction on the part of the weak muscles. The + 1.50 D. cylinder is the most useful but a weaker one may be used at the beginning. One should be placed before each eye and, if the weak muscles are the superior obliques, their axes must be placed in the lower temporal quadrant, at first 15° from the vertical, when, because of the slight retinal displacement of the object looked at, only a slight demand is made on the muscles, which should be kept up, in an intermitting way, for 5 minutes; then the axes should be revolved to 30° from the vertical when, because of a greater displacement of the images, a greater demand for contraction is made on the part of the weak obliques, which should be kept up intermittingly for 3 minutes; now, lastly, the axes of the cylinders are revolved to 45° from the vertical, when the maximum displacement of the images occurs and, hence, the maximum demand is made on the muscles, which should be continued intermittingly for 2 minutes only. As in the exercise of the recti, by means of prisms, the best way to get contraction and relaxation alternately and in rythmical order, is to lower and raise the frames containing the prisms every 5 seconds, so, to get rythmical contraction and relaxation of the obliques under exercise, it is best to lower and raise the frames containing the cylinders every 5 seconds, throughout the sitting. It is unfortunate for the convenience of the patient that the relaxation of ocular muscles does not quickly follow the closing of the eyes, since it would be much easier to open and close the eyes every 5 seconds than to lower and raise the frames at the same interval. The oblique muscles relax much more readily than the recti, on closing the eyes, but even these do not completely relax in the short time of 5 seconds.

In most cases of insufficiency of the obliques, exercising by means of cylinders once a day is usually sufficient. The best time for this exercise is before breakfast; the object looked at should be a candle or lamp 15 to 20 feet distant. The cylinders should be properly centered. What prisms are to the recti cylinders are to the obliques. In either case the lenses correcting refractive errors should be worn during the exercise, in order that the best results may follow. The only exception to this rule is in the wax-taper exercise of the internal recti, when no lenses should be worn.

The expression "in suitable cases" has occurred frequently in this paper, and has been properly used. Its use implies that there are cases of heterophoria not suited to the exercise treatment. Such cases are numerous, and how to manage them is a most interesting question. The higher the degree of heterophoria, shown after a focal error has been fully corrected, the greater the necessity for operative interference, and the more extensive must be the operations. Given a case of Exophoria of 10° in the near and 6° at a distance, we should attempt to correct the 6° by operations, effecting, as nearly as possible, half this correction by a partial tenotomy on one external rectus, and the balance by a partial tenotomy of the other, from three to six weeks later. To do more than this by means of the operations would be to develop some Esophoria for distance, a thing not desirable, while to do less would be to run the risk of leaving so much exophoria that the rythmical exercise by means of the wax candle, or by prisms, one or both, could not bring about orthorphoria.

In still another case the exophoria might be so great that, after a partial tenotomy had been done on each external rectus, there remain a few degrees of exophoria for distance, so much that there can be no hope of curing by exercise. In such a case, instead of trying to effect more by repeating the operation on either one or both of the externi, one or both of the interni should be shortened. As in partial tenotomies so in shortenings, it is better to devide the operation between the two corresponding muscles, for reasons long since given by Stevens. Having corrected all the exophoria for distance, falling only a little short or going only a little beyond, the remainder may be relieved by the methods of exercise already set forth; but in no case should the exercise be commenced within six weeks after the last operation.

In relieving esophoria by operations and exercise the principles laid down for exophoria hold good, the operations on the muscles being reversed; and, too, the esophoria to be corrected is that determined by the near test, leaving the difference shown between the near and the far tests to be corrected by the rythmical prismatic exercise of the externi.

In left hyperphoria of not less than 1½° nor more than 3°, this being, as a rule, the same for distance and in the near, some of it should be relieved by a partial tenotomy of the left superior rectus and the balance cured by exercising the left inferior and the right superior recti; but if there is more than 3° of the vertical error, in this case the operative effect should be divided between the superior of the left and inferior of the right, allowing an interval of not less than four weeks between the operations. Rather than over-correct leave some of the original error for correction by the exercise.

As to Cyclophoria nothing is applicable except the exercise by means of cylinders.

Whenever more than one of these muscular errors exist at the same time, all should be corrected by either exercise or operation, or both.

WOUNDS OF THE EYE BALL*

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This subject is one of great importance to all physicians. A volume could be written on it, but I shall make no attempt to cover all the ground. I shall treat of those injuries only in which there has been solution of continuity. Although germain to the subject, I shall not discuss sympathetic Ophthalmitis as such. As has been said of head wounds, so we can say with about equal exactness of the wounds of the eye ball: That is, there is no wound of it so slight as to be ignored and but few so grave as certainly to result disastrously. I have seen a case in which a small cut through the cornea ruined the eye, while on the other hand there have been cases in which a leaden ball has passed entirely through the eye-globe without very serious injury to its appearance or function.

It would be unwise to attempt to enumerate here all the methods of wounding the eye-ball or the kinds of missiles used.

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* Read before the Tennessee State Medical Society, April 13, 1893.

The seriousness of eye-ball wounds varies according to their position, extent and depth, and the nature of the missile producing them. As a rule wounds of the ciliary region are much more serious than others, and for this reason that region is known as the "danger region." It is the zone of the globe ilmited in front by the sclero-corneal line and extending backward one fourth of an inch The reason that wounds there are so serious is because of its rich blood and nerve supply and of the attachment of iris, lens and ciliary body to that region.

Wounds of the eye-ball may be divided into those which are not complicated by a foreign body remaining in the ball and those so complicated. Another division might be, into the clean cut and those that are lacerated. Another is the superficial and penetrating. These divisions frequently unite or overlap each other. For instance, a cinder imbedded in the cornea is a superficial wound and one complicated by a foreign substance remaining in the wound. A small piece of steel penetrating to the interior of the ball is an example of penetrating and complicated wound. Another classification is now admissible, namely, aseptic and septic. A wound made by a missile entirely free from infectious matter will produce a minimum amount of injury, and the disastrous results of a wound will, other things being equal, be in proportion to the septic material introduced into it. This fact should be given due weight in prognosis, and it is also suggestive as to treatment.

The general principles as to the treatment of wounds in other parts of the body hold good here. First, scrupulous removal of all foreign material practicable. Second, rest. The first rule includes washing the wound and the whole eye-ball and its appendages with appropriate antiseptics, as an aqueous solution of bichloride of mercury 1 to 3,000 or 4,000. Every physician should be thoroughly impressed with the importance of this procedure. Continue the antiseptic wash as long as there remains solution of continuity.

Antiseptic compress and bandage is called for by the second rule, that of rest. Cold applications will be proper for 48 or 72 hours. After that warm or hot ones will as a rule do more good.

In wounds of the cornea which do not penetrate to the anterior chamber, a simple antiseptic wash occasionally used, with or without a bandage, is usually sufficient. Cocaine or atropia or both may be used if there be much pain either at first or later. A clean-cut corneal wound, even though entirely through the cornea, generally heals promptly under an antiseptic dressing. If the aqueous humor escape it will usually be renewed in 48 to 72 hours. The chief danger in such wounds is entanglement of the iris in the wound. If the wound be central and entirely through the cornea, use atropia (gr. iii to water ℥i) to dilate the pupil as widely as possible. If it be near the margin of the cornea, use eserine (gr. i to water ℥i) to contract the pupil. If the iris protrude, try, under strict antisepsis, to replace it. If you fail, excise it close to the cornea and try again to reduce it. Use the utmost caution and gentleness in these instrumental manipulations. Use atropia or eserine as the case may demand to assist you in these efforts. If you fail again, use atropia or eserine as indicated by the position of wound and put up the eye antiseptically.

If the eye be seen immediately after injury there is a fairly good chance of replacing and keeping in place a prolapsed iris. If not seen until several days after injury it is hardly wise to attempt to replace it although some authorities advise it, if the anterior chamber be full. It is usually better to excise the protruding portions. If not seen until after the first day and the iris is not protruding nor entangled in the wound, but only attached to the posterior surface of the cornea at seat of wound, the wound should not be reopened, but vigorous efforts should be made, by means of atropia, or eserine or both used alternately to break up the adhesion and thus free the iris. As to the method of using these drugs: If the wound be central, use atropia; if marginal, use eserine. If between these positions, or if one of these drugs fail to free the iris from its central or marginal attachment, then you may use them alternately.

If the iris itself be wounded, the case is more serious, and atropia, rest and cold will be indicated.

If the lens be injured, especially if the capsule be broken, the case is still more grave. If the rent be small, atropia, rest and protection from light may prevent serious results. Cold should not be used longer than the third day.

In these cases the lens may swell only moderately and there need be no hurry about its removal. If the wound of the lens be extensive or, in any case, if the lens swell excessively, it should be removed, because it may do great injury by pressing on surrounding tissues.

Of course we expect all punctured, incised, or torn lenses to become cataractous.

In wounds crossing the limbus or wholly in the sclera, all portions of the contents of the ball which protrude should be cut off close to the surface Should the wound gape, it may be closed by one or more stitches.

A smoothly punctured or incised wound, although involving the ciliary region and extensive, may not ruin the eye. Prompt and careful antiseptic treatment may often save such an eye, especially as to form and appearance, although vision may be seriously impaired. An eye so wounded posterior to the dangerous zone need not be despaired of, although the foreign body go entirely through it and a part of the vitreous escape. If such a wound be deep, lacerated and extensive, it becomes more serious. Such a wound as last mentioned in the ciliary region is exceedingly grave. The vision will almost certainly be destroyed and the ball will be in imminent danger of disorganization. But if the instrument causing the wound be a clean one and the eye have prompt attention, and the patient be intelligent and near by, we can await results, although it is hazardous to do so. Should violent reaction set up and total ruin of the eye for vision be certain, enucleation is demanded. In the case of a child or lady we may hesitate, unless the appearance of the eye as well as its vision is spoiled. If so, enucleate without delay.

A foreign body complicating such a wound makes enucleation the more imperative; I might say absolutely so.

This naturally leads me to speak of those cases in which a foreign body remains in the eye. In general terms, such a complication adds 50% to the gravity of a wound of the eyeball.

A foreign body, any portion of which projects beyond the surface of the ball, can usually be removed without much difficulty. If it lie loose in the anterior chamber it may be removed by cutting through the cornea at its margin and nearest the foreign body. If sticking in the iris it may be removed by a magnet or forceps introduced through the original wound or one made for that purpose. Or a piece of iris including it may be removed. If it lodge in the lens, unless it be very small or aseptic or both, the lens and foreign body must be removed together if possible. It is when the foreign body has penetrated so deeply into the eye-ball as to be out of sight that the case becomes most serious. It sometimes passes entirely through the ball and lodges in the orbit or elsewhere, as is often the case with small shot. In such a case we may eliminate that factor in our prognosis, but we must not forget the mischief it may cause if it remain in the tissues near the globe. Any case in which a foreign body remains in the globe is a serious one, and when it is a bit of steel, iron, stone, percussion cap or similar material, we may take it for granted that it is in the eye if it ever entered. Sometimes the shock, pain and visible effects are so slight that the patient will stoutly deny that there is anything in his eye and the surgeon may be thrown off his guard.

A careful examination with condensing lens and ophthalmoscope, with dilated pupil, will often clear up the case by revealing the missile itself in the eye, or its track through its coats and media. I do not forget that in a few cases the magnet may be used to remove bits of steel from the eye; principally from the anterior portions; sometimes from the vitreous chamber; but I cannot discuss that further now.

If the iris or ciliary body be cut, the anterior chamber may be filled with blood so that we cannot see the foreign body or its track, at least for the first day or two. It is well to remark just here that blood in the anterior chamber will usually be absorbed in a day or two, while that in the vitreous may linger many days or even permanently.

As a rule no attempt should be made to remove effused blood from either locality.

If we judge that the foreign body is small and non-infectious and has not lacerated the iris or ciliary body, we are justified in treating the eye on the general principles herein given and await developments, not neglecting however to warn the patient of the risk he is running, nor cease to keep the closest watch on the other eye. Of course it is sympathetic inflammation in the unhurt eye that is the over-shadowing danger in such cases. If the missile incise the iris and pierce the lens we may still do as advised in the case last supposed, but the wound is more serious.

Should the cornea, iris and lens all be badly lacerated, especially if we suppose the missile to be rough and septic, take out the eye at once. In any case of foreign body in the eye, if you are convinced that you will have loss of vision and severe inflammation, take out the eye. If the ciliary region be badly torn and the missile remain in the eye, remove the eye. If in a case in which you have been in doubt, severe panophthalmitis supervene with evident destruction of vision, take out the eye. If the natural appearance of the eye has been spoiled you can be freer to take out the eye in all these cases. While vision remains fairly good in any eye you should not remove it under any circumstances. It is difficult to lay down aphorisms on this subject of removing eyes. Much must be left to the judgment of the surgeon in charge, for a great deal depends on circumstances. For instance, in cases of persons to whom personal appearance is of no great importance, who live at a great distance from a competent surgeon, or are ignorant and careless, enucleation will be more often demanded than in the opposite class of cases. In the case of a child, or lady, or public speaker, you will hesitate to enucleate unless the indications are imperative.

I would like to warn physicians, not to be too timid about enucleation, nor should we ever fail to warn with great earnestness any person who has one badly injured eye, especially if a foreign body be in it, that there is great danger to his other eye. I do not doubt that scores of eyes are yearly lost by sympathetic inflammation, because sympathetic or timid doctors have declined to remove the injured eye at once, or have failed to warn the patient of his peril in retaining it. To fail to warn a patient of such peril is almost criminal—there is no good excuse for it You should so impress such a patient of his danger that he will think of it during the day and dream of it at night, and never forget it.

I shall not now discuss the claimed advantages, positive and relative, of optic nerve-resection and subconjunctival corrosive sublimate injections as practiced by De Wecker and Abadie respectively, as substitutes for enucleation, because their merits have not been fully and definitely settled, although the promise seems to be for something of value.

While antisepsis has made me a little more conservative as to removing wounded eyes, still there is danger that by depending on it we may be thus led into false security, to our own ultimate chagrin and to the lasting misfortune of our patients.

Of course evisceration instead of enucleation may be done in some cases.

RELATIONSHIP BETWEEN THE CENTERS OF ACCOMMODATION AND CONVERGENCE.

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That there is a relationship between Accommodation and Convergence has been long taught; but the full extent of this relationship and its consequences have not, to the present, been fully set forth in any published work. There is more in it than the simple fact that for every degree of convergence there is a corresponding activity of the accommodation. In a pair of emmetropic and orthophoric eyes this is probably all, and it is enough; but in the many eyes not thus happily conditioned there is much more than this dependent on the intimate relationship between these two centers.

There is no study more interesting than that of the nuclei (the centers) beneath the aqueduct of Sylvius and in the floor of the fourth ventrical: and of these centers not the least in interest is the study of the oculo-motor center, the one first in position and first in importance. It is the largest of these centers and itself is the home of several centers. As a whole we may speak of it as controlling the sphincter of the iris, the muscle of accommodation, the internal rectus, the superior and inferior recti and the inferior oblique; but for each of these muscles there is, in this nucleus, an individual center, the first three of which, viz., that for the sphincter of the iris, that of accommodation and that of convergence, are so intimately related that when one is excited into activity the other two either act or stand ready for action. All of the centers of the oculo-motor nucleus have one common master which is the guiding sensation residing in the retina, its home being the *macula lutea* and its immediate neighborhood. The two ocular centers (the fourth and the sixth) situated further back, are also under the control of this same guiding sensation; but it is not intended, in this paper, to study these and their relationship to each other and to the centers of the oculo-motor nucleus.

The oculo-motor center not only has connection, by means of nerve fibres, with the muscles already named; but it also receives fibres from the retina through the optic nerves and tract, through which the "guiding sensation" sends its commands or requests. This center also has an intimate connection with its fellow center of the opposite side, which enables them to act in harmony, although the one can never act for the other.

From this brief study of the centers giving motility to the eyes we may pass on to a study of the two most intimately related centers, the one of accommodation and the other of convergence. As already intimated the whole truth is not embodied in the statement that for every degree of convergence there is a corresponding contraction of the ciliary muscle (in persons under 45 years of age and emmetropic). The following statement is full of truth and is for the first time made: *Whenever one of these centers is called into activity there is a tendency on the part of the other to become active in a corresponding degree.* If action of the associated center is not put forth it is because the guiding sensation commands it not to do so, or the center no longer has its proper organ under its power. In one of these ways is explained the dissociation of these centers by prisms affecting convergence and by convex and concave lenses affecting accommodation; in the other way is explained the failure of the accommodative center to exhibit activity corresponding to convergence in the eyes of the old, and in young eyes that are under the recent influence of a mydriatic, and in aphakial eyes.

When prisms are placed before the eyes, the bases in, less convergence is needed but the same accommodation must be exercised. It is only because of the imperative command of the guiding sensation that the accommodation does more than its accustomed work for the degree of convergence exercised; and, too, under this new condition, the unusual activity of the accommodation excites a *tendency* to greater activity on the part of the internal recti, which is kept in abeyance by the guiding sensation.

When properly centered convex lenses are placed before young, emmetropic eyes, while the patient looks at a book, the two centers are dissociated in *action* but not in *tendency*. Under this condition the guiding sensation compels the ciliary muscle to relax in part or in whole, depending on the strength of the lenses used, which excites in the converging centers a *tendency* to relax, which is prevented by an unusual demand on this center compelling it to effect the needed amount of convergence, and, on the other hand, this excessive (proportionately) demand on the centers of convergence, excites a proportionate *tendency* to action on the part of the centers of accommodation, which is alone restrained by the guiding sensation.

Again when properly centered concave glasses are placed before the eyes, there is dissociation of *action* but not of *tendency*. On looking at the page more than the usual amount of accommodation is necessary in order to have sharp images on the retinæ. This extra demand on the accommodative centers is not attended by a corresponding increase of convergence because the guiding sensation suppresses the *tendency*.

Dissociation of accommodation and convergence, in normal eyes, is never comfortable, and the discomfort is due as much to the *restraining* influence of the guiding sensation over the one center as to its *exciting* influence over the other.

When accommodation and convergence are dissociated by age or by the continued influence of a mydriatic, on the ciliary muscle, or by the removal of the crystalline, the center of accommodation not only becomes unable to influence the center of convergence, but also becomes incapable of being influenced by it. Such dissociation, per se, is never attended by the discomfort that is brought about in dissociation by means of prisms and convex and concave lenses.

There are conditions modifying the salutary association of these two centers, from which result phonomena that may be clearly understood. There may be but one unfavorable condition, or there may be two or more associated. Of the disturbing conditions we may speak first of

HYPERMETROPIA

simple or associated with astigmatism. For the present we will consider this condition as unassociated with any form of heterophoria, at least as far as the external and internal recti are concerned. The hypermetropia, for convenience of study, may amount to 3 D. The existence of this error creates a demand, for the satisfaction of the guiding sensation, on the accommodative centers when vision is fixed on distant objects. The activity of these centers, when the visual lines are parallel, excites a *tendency* to activity on the part of the converging centers, which is suppressed by the influence of the guiding sensation, so long as the two eyes are on their guard: but let any one of the several tests for heterophoria be applied, the guiding sensation loses its "grip" and the *tendency* to act is converted into *unrestrained action* and we have Esophoria shown which has no foundation in the structure or attachment of the internal recti. When these eyes are used in near work—at a distance of 14 inches—there is twice the demand on the accommodative centers that would be made were there emmetropia. The excessive excitation of the accommodative centers is necessarily attended by a corresponding disposition for greater activity on the part of the converging centers than is necessary for bringing the visual axes together at the point looked at, but the guiding sensation suppresses enough of this *tendency* to prevent the axes coming together at a shorter distance. The test for heterophoria is applied and, the guiding sensation having lost its influence over the converging centers, Esophoria in the near is shown. The practical deduction to be made from this observation is that *a full correction of the hypermetropia will relieve not only the focal error but the Esophoria as well.* The wearing of these correcting lenses continuously will relieve, from the begining, all asthenopic symptoms of whatever nature. And, too, this form of esophoria (pseudo-esophoria) disappears when accommodation is suspended by age.

Again, hypermetropia may be associated with an

ESOPHORIA

which depends on an over-development of the internal recti or on their attachment being too far forward, or on both of these causes combined. If the intrinsic esophoria is low in degree, although it will be increased by the hypermetropia, the only resulting phenomena will be asthenopic symptoms of one kind or another, the disposition on the part of the center of convergence to overact being restrained by the guiding sensation. On the other hand the inherent Esophoria will have no undue influence over the accommodative centers, hence there is never found in such eyes even a tendency to spasm of accommodation.

The practical deduction made from our study of hypermetropia complicated with inherent Esophoria is: *give a full correction of the hypermetropia and, in that way, relieve not only the focal error but also relieve all of that part of the Esophoria not inherent in the muscles.* Should the remaining Esophoria give trouble, it must be corrected by either rythmical exercise of the externi or by partial tenotomies of the interni, or by both procedures.

Esophoria depending on hypermetropia solely is wholly relieved by advancing years, as well as by glasses that fully correct the focal error. It is also relieved, after the first few hours, by the use of a mydriatic and this relief continues with the continued use of the drug. A very peculiar feature of the use of a mydriatic is that, at first—probably from one to several hours—a mydriatic, in hypermetropic eyes, will increase the Esophoria, will lessen an exophoria or convert it into orthophoria or even into an esophoria. Until now this has been unexplained, but the following explanation is not only new but it must be true:—The mydriatic acts on either the endings of the accommodative nerve fibres, or on the fibres of the muscle of accommodation, certainly not on the accommodative centers which, therefore, must remain in a state susceptible of excitation by the demands from the guiding sensation. As the muscles of accommodation pass into their forced rest, the retinal images become less sharp in outline, the blurring increasing up to the point of full suspension of accommodation. The guiding sensation calls on the accommodative centers for sharper images, and the impulse is sent out but finds the muscles unresponsive: the call is repeated more eagerly and a stronger impulse is sent to the sleeping muscles, and still no change is effected in the images: and thus the calls and the responses are kept up for a longer or a shorter time. For every degree of activity excited in the accommodative centers there is a corresponding *tendency* to activity generated in the converging centers which is kept in abeyance by the same guiding sensation that is calling for action on the part of the accommodative centers. So long as the calls are made on, and reponses are made by, the accommodative centers, the centers of convergence stand ready to call into unusual action the interni, which they do the moment the guiding sensation is robbed of its restraining power by the test for heterophoria, when esophoria is shown. But finally the guiding sensation ceases its calls or, from exhaustion, the acommodative centers cease to respond, and now the normal muscular condition is again shown, and will remain manifest although the mydriatic may be continued. From this observation on the mydriatic as a disturber of the salutary relationship of the centers of accommodation and convergence we deduce the following conclusion: *All tests for lateral heterophoria are wholly unreliable within the first few hours after eyes have been brought under the influence of a mydriatic.*

Again hypermetropia may be associated with an intrinsic or true Esophoria of so high a degree that, while the guiding sensation calls into activity the accommodative centers, that sharp images may be formed, there is excited in the converging centers a *tendency* to activity which cannot be restrained by the guiding sensation and their results

AN INTERNAL STRABISMUS.

In many cases of strabismus the intrinsic esophoria could be restrained by the guiding sensation, if the eyes were only emmetropic or even myopic: but there being hypermetropia to excite pseudo-esophoria, this, combined with the true esophoria, throws off the *restraining* influence of the guiding sensation and esotropia results. This condition, as is well known, occurs mainly in early child-hood, when accommodation is most powerful, and when there is a natural disposition on the part of the child to hold an object too near the eyes. Many a child with crossed eyes would never have been thus disfigured if they had not been allowed to look at things attractive to them, at too short a distance from the eyes. With the above thought in mind it is plain to us how many crossed eyes may be straightened, in early child-hood, by suspending the accommodation and correcting the focal errors, by means of which the cause of the pseudo-esophoria is removed, leaving the true esophoria to be called back into a state of suspension by the guiding sensation. The practical conclusion reached is this : *give a full correction of hypermetropia in all cases of internal squint.* Such a correction cannot be determined without first bringing into a state of rest the hyper developed ciliary muscles Without the further use of a mydriatic many cases of esotropia can be corrected by the continuous wearing of the convex lenses; but there are many other cases in which the mydriatic must be used for a long while, in order to prevent any excitation of the accommodative centers in either near or far seeing, and thereby completely preventing the slightest pseudo-esophoria. It takes a mydriatic, in some cases, to subdue ciliary muscles that have become over-developed, which, in spite of the correcting lenses, would exert too much power in response to an impulse from the accommodative centers, which impulse, because of long habit, itself might be too great. This over-action (the lenses being on) has been falsely termed spasm of occommodation, a condition which can have no existence except as a result, or complication, of exophoria. It is only a continuance of a part of that action which was necessary before the correcting glasses were given : and as the action, when necessary caused pseudo-esophoria, the continued action, when not necessary, will likewise cause the same, hence the necessity for the mydriatic. Should the ciliary muscles become quiet without a mydriatic when objects at a distance are made throw their images on the retinæ, by means of lenses, the guiding sensation would call their centers into activity when an object looked at is near by. This needed stimulation of the accommodative centers will excite an excessive *tendency* to act on the part of the converging centers and there results squint in the near, the same disappearing when distant objects are again viewed. We conclude then that, while some crossed eyes may be straightened by glasses only, it is better to aid the glasses, in all cases, by the long continued use of the mydriatic. Nor should the fact that a mydriatic, at first, increases the strabismus deter any one from using it, for, as already explained in this paper when speaking of the effects of a mydriatic in cases of esophoria, exophoria and orthophoria, this apparently stimulating effect passes away in a few hours. In a case recently under our observation the increased effect lasted only an hour, when the strabismus began to lessen and, in a short time, disappeared, solely as a result of the mydriatic. Stevens was first to notice that a mydriatic not only was capable of increasing an esotropia but actually produced it in one of his cases which he published but did not explain. Since then we have observed its power to increase internal squint in all our cases, but have not been able to understand why until now.

In the correction of esotropia by mydriatics and lenses, the pseudo-esophoria has been distroyed and the esotropia has been converted into true esophoria which must be relieved at some time, by partial tenotomies, shortening of the external recti or by rythmical exercise. In many cases two or all of these procedures will have to be combined. Without them the intrinsic esophoria will remain always and be a perpetual source of nervous phenomena.

INTRINSIC EXOPHORIA

May be classed among the causes of disturbed relationship between the centers of convergence and accommodation. To prevent crossed diplopia the inherent power of the strong external recti leads the guiding sensation to call into excessive activity the centers of convergence. In this way the weak internal recti counteract the more powerful exteni. This augmented action of the centers of convergence excites a corresponding *tendency* to act on the part of the centers of accommodation, which, in most cases, is restrained by the guiding sensation: but in some cases the *tendency to action* of the accommodative centers when the interni are weak, becomes uncontrolable by the guiding sensation and real spasm of accommodation (pseudo-myopia) is developed. This spasm may be thus excited in emmetropic, hypermetropic or myopic eyes, and is to the muscle of accommodation what esotropia is to the interni—in each the guiding sensation has lost its restraining power to control a tendency excited by a disturbance of the normal relationship between the centers of accommodation and convergence.

The *tendency* to act excited in the accommodative centers by the over-acting centers of convergence, whether suppressed by the guiding sensation or not, strengthens the converging centers in their mastery over the weak interni, and this, too, in all eyes whether emmetropic, hypermetropic or myopic. But whatever may be thought of the *tendency* to activity excited in the centers of accommodation by over-taxed converging centers, making the latter stronger, it cannot be doubted that actual ciliary strain, such as is necessary in hypermetropic eyes, does give to the conveaging centers easier and more complete control over the interni. The reason for this has already been made clear. Therefore this reasonable deduction : *hypermetropia, when associated with exophoria, should not be corrected if low in degree, and should be only partially corrected if great in quantity. The greater the exophoria the less of the hypermetropia should be corrected.* The ciliary strain necessary for the correction of 1 D. to 3 D. hypermetropia is more kindly borne by the nervous system, in many cases of exophoria, than would be the pseudo-exophoria which the correcting lenses would engender. Thus there is a reason for making no correction at all or only a partial correction of hypermetropia in certain cases (the exophoric): while, on the other hand, there is every reason for making the fullest correction in other cases (the esophoric).

Who has not seen one or many hypermetropes wearing comfortably concave lenses, who could not bear the use of convex lenses? Such cases have always been exophoric. For the same reason an emmetrope who is exophoric, could wear with increased comfort concave glasses. In myopia of 3 D. there is no ciliary strain required, hence the guiding sensation never makes a demand on the center of accommodation. This is well in cases of esophoria, so far as comfort is concerned, but in orthophoria and exophoria a correction of the myopia would greatly increase the comfort of seeing at all distances.

As convex glasses and mydriatics will correct an esotropia, so concave glasses and myotics should correct an exotropia, but as to the last statement we have had no experience. In neither case is the intrinsic muscle error corrected (cured)—it is only held in abeyance the more easily.

The first effect of a mydriatic when instilled into eyes that are hypermetropic and esophoric will be attended by suffering more or less severe, while the reverse is true in cases of hypermetropia associated with exophoria. The reason is clear.

The conclusions of this paper may be placed together here :—

1. Give a full correction of hypermetropia when associated with esophoria.

2. Give no correction or only a partial correction of hypermetropia when associated with exophoria.

3. Give a full correction of myopia when associated with exophoria, and when there is orthophoria.

4. Give only a partial correction, or none at all, of myopia when associated with esophoria.

5. A full correction of hypermetropia cures a pseudo-esophoria in esophoric cases, and creates a pseudo exophoria in exophoric cases.

6. A full correction of myopia cures a pseudo-exophoria in exophoric eyes, and creates a pseudo-esophoria in esophoric eyes.

7. In hypermetropia associated with internal strabismus, fully correcting lenses, aided by mydriatics, remove all pseudo-esophoria and thus make it possible for the guiding sensation to resume control of the converging centers in such a way as to restrain the true esophoria, and thus cure the strabismus.

8. In myopia associated with exotropia, fully correcting lenses, with myotics, will remove pseudo-exophoria and thus make it possible for the guiding sensation to restrain the true exophoria and thereby cure an external squint.

9. Any test for lateral heterophoria within the first few hours after beginning a mydriatic is wholly unreliable, even with lenses on.

The above conclusions are based on the idea that nothing is to be done for the direct relief of the muscle errors. A better practice would be to cure the heterophoric conditions by rythmic exercise, when possible, otherwise by operations (partial tenotomies and shortenings) and rythmic exercise, and then give an approximately full correction of whatever focal error there may be.

A CASE OF REFRACTION.

Written for the Ophthalmic Record by
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About two years ago Miss M., aged 23, consulted me about her eyes; Vision $\frac{18}{40}$ for both eyes; after use of homatropine V. = $\frac{18}{70}$. I endeavored to use retinoscopy, but owing to the fact that, as I moved the mirror, shadows seemed to come from different meridians and with different degrees of intensity at the same time, I was unable to determine at all to my satisfaction, the refraction of the eyes Nor did the use of atropia for several days, nor of dubioisin, in any way change the condition of affairs. As the result of several prolonged trials I found that, with + 1$\frac{3}{4}$ D. cyl. ax. 90° ⊂⊃ — $\frac{1}{4}$ D. cyl. ax. 180°, Miss M. could make out the letters in $\frac{18}{15}$, but that every letter had "a tail to it", or "was doubled". I came to the conclusion that I had to do with a case of spasm of the accommodation and no mydriatic would have any effect. Miss M. finally became tired of my endeavors to "fit a glass" and went to her home in another city.

On March 3, 1893, Mrs. W. aged 27, consulted me saying that all her life she had had trouble with her eyes. About two years ago she consulted an oculist, who prescribed glasses which gave her relief for distant vision, but which she could not use for reading even a few minutes without their causing her eyes to water and ache; nor had she been able to get a pair of glasses that would allow her to read. V., O. D. and O. S. = $\frac{18}{15}$. L. hyperphoria $\frac{1}{4}$°. Esophoria for 18 feet, $\frac{1}{4}$°. Abduction 8°. Adduction 20°. With — $\frac{1}{2}$ D. cyl. ax. 180 before each eye, patient reads $\frac{18}{10}$ with ease, and this glass had been worn for two years with comfort for distant vision. After use of atropia V. for O, D. and O. S. = $\frac{18}{60}$. *With — $\frac{1}{2}$ D. cyl. ax.* 180 *before each eye patient can now read only* $\frac{18}{70}$; with + 1 D. cyl. ax. 90° before each eye, patient can read $\frac{18}{15}$, but not with perfect satisfaction. Using retinoscopy I find the same confusion of shadows that had existed in the case of Miss M. The pupil was widely dilated. Revolving the ophthalmoscopic mirror before my eye, I see in the vertical meridian of the outer half (and the same for the inner) of the eye of the patient two distinct shadows, of different intensities, both moving against the movement of the mirror, one of these shadows proceeds from the edge of the iris, the other from a meridian half way from the pupillary edge to the centre of the lens and is a short shadow i. e. does not proceed from the whole length of its pupillary meridian, but only from the central half.

Placing before the patient's eye stronger and stronger + lenses, I find that it takes + 1½ D. to reverse the outer shadow and a + 2¼ to reverse the inner. For the horizontal meridians the same thing occurs, only in this case + ½ D. reverses the outer shadow, while + 1¼ D. reverses the inner. It is thus possible *to get from the same half of the eye at the same time two shadows moving in opposite directions.* Thus, holding before the eye a + 1¾ D. lens and revolving the mirror for the vertical meridians it will be found that the outer shadow now moves with the mirror, while the inner shadow moves against it, and both shadows move at the same time. Or with a + ¾ D. sph. before the eye the same thing will be found to be the case when we revolve for the horizontal median. The explanation of this seems to be that the refraction for the nucleus of the lens in this case differs from the refraction of the cortical part of the lens. Thus we find that *the lens nucleus* requires a + ¼ D. sph. ⊂⊃. + 1 D. cyl. ax. 90°, to correct its error of refraction; while for the cortex + ½ D. cyl. ax. 90° ⊂⊃ — ½ D. cyl. ax. 180° is required. + 1 D. cyl. ax. 90° was prescribed for reading—the cortical refractive condition being neglected—and these glasses have given perfect satisfaction. After seeing this case I have come to the conclusion that the same trouble existed in the case of Miss M., and not spasm of the accommodation.

OPTIC ATROPHY CONSECUTIVE TO MAMMARY CARCINOMA AND INFLUENZA.

Written for the Ophthalmic Record by
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In 1888, Mrs. E., 44 years old, an over-worked dressmaker, who had been under my observation for some years, consulted me for a suspicious hard nodule in the left breast. As I was on the point of abandoning general practice and leaving the city for a year I warned her of the possibly serious nature of the case and advised her to see another physician.

Soon after my return, a year later, I was requested to be present at an operation for the removal of the growth which had attained considerable size, and involved the axillary glands. The diseased tissues were thoroughly removed and the patient promptly recovered, but a lymphangitis soon developed in the left arm and after a few months (less than six) it became necessary to remove some nodules which had developed in the cicatrix. In the winter of 1891–2 the disease had recurred and was rapidly progressing.

An attack of influenza occurred in January and early in March she discovered one day that her right eye was totally blind. Dr. L. A. Nippert, her attendant, on examination, found some venous congestion of the optic disk.

A week later I was asked to see her. Found a moderately dilated, immovable pupil, dusky congestion of the disk, and nothing more. The left eye appeared normal.

Four weeks later, I examined the eye again and found a decided paleness of the left optic disk, the condition being otherwise unchanged.

In six weeks the patient died without my having seen her again. Whether a carcinomatous development in the brain centres or the influenza were the cause of the optic atrophy is perhaps an open question. The eyes were formerly normal save a slight refractive error for which I had prescribed in 1888.

The history, and the absence of other paralyses, would seem to point to the influenza rather than the carcinoma.

HEMIANOPSIA AS A SEQUEL OF LA GRIPPE.

Written for the Ophthalmic Record by

H. GIFFORD, M.D.,

OMAHA, NEB.

For some years I have been watching the journals for reports of hemianopsia as an influenza-sequel: but until the publication of Dr. Graddy's paper (Ophthalmic Record I, 12), I saw nothing of it. His case was that of an old woman who became nearly blind (small central area of light perception) in both eyes, after three weeks of *la grippe.* The blindness improved but returned again and finally, after three months, the patient was left with complete right hemianopsia and V. = $\frac{6}{18}$, [in each eye?]

My case is the following:—June 20, 1890, J. H., æt 48, consulted me for disturbance of vision which he first noticed during or at the close of an attack of *la grippe* in February of the same year. During his sickness he had much severe pain in the back of the head, on one side, but is not sure which side it was. The defect of vision has not changed since it was first noticed. Subjective examination shows him to have right sided hemianopsia. In each eye, the line of demarcation follows the vertical meridian accurately except at the centre and at one point a little below this, where it deviates a little to the right. Aside from this, the right half of the left field is gone entirely while in right field there is a small area at the lower outer corner where light is still perceived R. E. V. = $\frac{26}{50}$. L. E. V. = $\frac{23}{30}$—. Eyes, objectively, normal throughout, except that optic disks are a little paler than the average. Patient was seen again April 3, 1893, at which time V. of R. E. was $\frac{20}{50}$; that of L E. $\frac{20}{30}$ +; hemianopsia practically unchanged, objective conditions also were unchanged.

Concerning the immediate cause of the hemianopsia in this case, each is at liberty to make his own guess. The occipital, one sided pain would indicate a localized meningitis, secondary, perhaps, to a metastatic encephalitis.

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G. C. SAVAGE, M. D., Editor and Publisher,
621½ Church St,, Nashville, Tenn.

The last issue of this Journal was "in the fashion," from an ophthalmic stand-point—it contained no editorials, and for the reason that the Editor was 3,000 miles from home at the time it was being made up.

PROF. L. WEBSTER FOX, M.D.

We have just received the information that our old-time friend and fellow-graduate has been elected to a Professorship of Ophthalmology in the Medico- Chirurgical College, Philadelphia. We congratulate both the College and Fox.

DR. H. D. NOYES

Is acknowledged on all sides as a clear thinker and a ready writer. It will be pleasant news to many of our readers that he is now engaged in getting out a new edition of his work on ophthalmology, which will soon come from the press. It may be said before-hand that this new edition will be a fair and full exponent of modern ophthalmology.

VOLUME I

Of the *Record*, as a whole, is almost exhausted. We have on hand sixty-eight copies which can be furnished, at the regular subscription price, to that number of new subscribers. On reproducing No. 1 of this volume, so as to meet demands for it, we had a few hundred additional copies run off, so as to be able to meet future demands for the volume complete.

Others, than the Editor, being judges volume 1 is worth far more than the price, $2.00. Only 68 calls can be responded to.

VOLUME II.

The next issue closes the current volume. A few subscribers have not yet paid the amount due. All who have not paid will find a slip enclosed in their copy of this issue (No 11) stating the amount of indebtedness. Although the amount is small a personal check may be sent in liquidation. We desire to close the business of each volume before issuing the last number. All of the income of the *Record* goes to strengthen the publication and not into the private purse of the Editor.

MISSING NUMBERS OF THE RECORD

Will be sent to subscribers free, if application be made before the end of the current volume (June). This applies to all of volume 2, and to all of volume 1, except No. 2, which issue is so nearly exhausted that all copies on hand must be kept to meet the demand of new subscribers for volume 1 complete. Look over your Record file and report missing numbers and we will do the rest.

THE AMERICAN MEDICAL ASSOCIATION

Will hold its next annual meeting in Milwaukee, commencing June 6. The meeting promises to be a very important one in several respects, At some time during the week the committee on "Revision of the Code" will report, but whatever may be the recommendations they cannot come up for final action until one year hence.

The scientific work of the Sections will not fall behind that of former years, judging from the programs that have been published.

THE DAVIS—BURNETT CONTROVERSY

Still goes on. It seems that it could be settled by every one, who owns and uses an ophthalmometer, acknowledging by whom he was influenced into purchasing this very valuable instrument—whether by Roosa or by Burnett. We bought ours because we were led to believe in its utility—not infalibility—by Burnett, and we are pleased. We have influenced others to buy, but after all, this was only Burnett's influence working through us. Javal's letter published in a late issue of the Journal of Ophthalmology will likely settle the question in dispute favorably to Burnett.

DRS. W. F. NORRIS AND C. A. OLIVER,

Of Philadelphia, will soon have before the medical profession "A System of Diseases of the Eye," in two volumes of about 1,200 pages each. They claim to have embodied in this work all the medical learning of the world pertaining to the eye, up to the time of going to press. The new truths set forth in this issue of the *Record* have come to light too late for a place in this edition of this great work.

The book has been written by about sixty authors living in this and other countries, each one of whom is looked on as devoted to a specialty within our specialty. We need mention only a few of these to show that the forthcoming work will be most valuable— to the oculist indispensible. Javal writes on Ophthalmometry; Stevens, on Heterophoria; Knapp, on Operations; Wm. Thomson, on Normal Color Perception and Color Blindness; Gould, on the Ophthalmoscope; Jackson, on Retinoscopy.

The work will cost $7.00 in cloth and $8.00 in sheep, per volume. It will be sold by subscription. The publishers are J. B. Lippincott Company, Philadelphia.

SECTION OF OPHTHALMOLOGY, A. M. A.

Chairman Risley and Secretary Gradle have not been idle during the year as is evidenced by the great number of papers they have procured. Read the list (complete) as published below and ask yourself the question "can I afford to be absent?" Come, and that, too, with the view of taking part in the proceedings. This Section has grown in importance yearly and its annual volume of proceedings ranks high.

The *Record's* stenographer has been officially employed to take down the discussions, and whatever you may say will appear only in the Journal of the Association and in the *Ophthalmic Record*—in the latter first.

The author of every paper has been requested to furnish the *Record* with a synopsis of his paper so that it may be published in connection with the discussion brought out by it. Many synopses have already been received. Should any fail to respond to the request sent him he alone will be to blame. We wish to make a complete publication of the work done.

The following is the program:

1. Pannus and its Treatment by Digestive Ferments, by J. A. Lydston, Chicago.
2. Hypertroyhic Conjunctivitis and its Treatment, by Cornelius Williams, St. Paul.
3. Phlyctenular Ophthalmia, by Dudley S. Reynolds, Louisville.
4. The Total Correction of Refractive Errors, by W. F. Coleman, Chicago.
5. *a*. History of a Case of Successful Extraction of a Piece of Steel from the Vitreous by aid of the Electro-Magnet. *b*. Study of a Case of Hemorrhagic Glaucoma with Microscopic Sections, by Chas. A. Oliver, Philadelphia.
6. Glaucoma, by L. F. Love, Philadelphia.
7. Unilateral Neuro-Retinitis, with report of cases, by B. L. Milliken, Columbus, Ohio.
8. Tobacco Amblyopia, by F. Dowling, Cincinnati.
9. Sympathetic Ophthalmia, by A. Hobby, Iowa City.
10. A Study of the Etiology of Blindness of pupils in the various State Asylums, by G. F. Keiper, Lafayette, Ind.
11. Skin grafting in Malignancy of the Eyelids and Orbit, by Flavel B. Tiffany, Kansas City.
12. Treatment of Granular Lids; Exhibition of Instruments, by C. B. Blubaugh, Parkersburg, W. Va.

13. Exostosis of the Orbit, by Robert F. Le Mond, Denver.

14. Some Rare Forms of Tumors of the Orbit and Eyelids, by J. Schneider, Milwaukee.

15. Strabismus Convergens, when and how shall we operate? by S. C. Ayres, Cincinnati.

16. Rapid Dilatation of the Lachrymal Sac. by S. L. Zeigler, Philadelphia.

17. Cataract Lenses, by H. V. Würdemann, Milwaukee.

18. Albinism of Eyes, by G. G. M. Gould, Philadelphia.

19. Commentaries on Diseases of the Lachrymal Passages, by H. Gradle, Chicago.

20. Posterior Sclerotomy as a Preliminary to some Operations for Glaucoma, by H. Gifford, Omaha.

21. Two Cases of Brain Tumor, where Optic Neuritis was the only Positive Sign.—Autopsies, by E. P. Morrow, Canton, O.

22. The Curvilinear Reflection of Weiss as a Pro-dromal Sign of Myopia, by B. Alex. Randall, Philadelphia.

23. Intra-ocular Injections of various Antiseptics, by G. E. De Schweinitz and H. A. Hare, Philadelphia.

24. Puralent Ophthalmia from the Standpoint of its Specific Microbic Cause, by A. Hinde, Chicago.

25. Relation of Diseases of the Upper Air Passages to Diseases of the Eye, by J. G. Carpenter, Stanford, Ky.

26. A Case of Sympathetic Neuritis after Evisceration, by F. C. Hotz, Chicago.

27. Treatment of Nasal Duct Obstruction, by Casey A. Wood, Chicago.

28. *a.* The Best Form of Rod and Rotary Prism Tests with a new Phorometer; *b.* Classification of Diseases of the Eye in Hospital Statistic, by E. Jackson, Philadelphia.

29. Squint and its Treatment, by J. H. Thompson, Kansas City.

30. The Artificial Ripening of Immature Cataracts, by B Bettman, Chicago.

31. Meningitis following Enucleation of the Eyeball, by S. D. Risley, Philadelphia.

32. Legislation in the United States for the Prevention of Blindness, by L. Howe, Buffalo.

33. The Results of the Use of the Electromagnet for the Extraction of Foreign Bodies, by C. Barck, Cincinnati.

34. Quiescent Foreign Bodies within the Eyeball, by W. B. Johnson, Paterson, N. J.

35. Some Practical Experiences with Muscular Anomalies, by T. E. Murrell, Little Rock, Ark.

36. Persistent Spasm of the Accommodation relieved by Tenotomy of the External Recti, by A. R. Baker, Cleveland.

37. Cataract Extraction in a Negro said to be 116 years old, by F. Trester Smith and B. F. Travis, Chattanooga, Tenn.

38. The Practical Value of the Ophthalmometer in the Measuring of Astigmatism, by L. J. Lautenbach, Philadelphia

39. Pterygium—Presentation of Instruments, by A. Blitz, Indianapolis.

40. Dendritic Keratitis, by W. H. Wilder, Chicago.

Papers without title promised by T. Y. Sutphen, Newark, N. J., and E. G. Gardiner, Chicago.

DR. F. B. TIFFANY,

Of Kansas City, has given us a very useful device in his map of the magnified image of the fundus of the eye. These maps are put up in tablets which go in pairs, one of which is for the right eye and the other for the left. These can be bought of Osborne & Pitrat, Kansas City, at a cost of $1.00 per set. The method of use we give in the Doctor's own words as follows:—

"Place the tablet just 30 cm. or one foot back and to one side of the plane of the patient's iris, so that when examining the right eye your left eye will be in front of the tablet; or if examining the left, the tab. will be opposite your right. The tab. may be attached to the wall or to the back of the patient's chair. The center of the tab. should be at the same hight as the pupil. To project the picture of the fundus of the right eye, sit at the right side and view the eye with your right, looking at the tab. with your left. To examine the left eye sit at the left side and examine with the left eye looking at the tablet with your right.

"At first, it is a little difficult to project the picture of the fundus and see it on the plaque, but a little practice will soon bring it out. If examining the right eye ask the patient to look slightly to the left and then view from the nasal side, that is look from within outwards. At first you will probably see the picture on the cheek or temple of the patient, if then you ask the patient to look slightly more to the left, the picture will shift from the face to the plaque, and at this distance of 30 cm. it will be magnified just twenty times its real size, as has been ascertained with mathematical precision, by Landolt.

"The tablet is checked off into squares of five millimeters and by casting the picture of the fundus upon it, it is easy to determine at once the size, relation and distance apart of each and all parts of the retina. For instance, if the diameter of the optic disc be one millimeter it should occupy the space of sixteen squares or 20 mm. each way ; again, if the distance from its center to the center of the macula lutea is four millimeters, then the distance should be the length of sixteen squares or 80 mm.

"A tracing with pencil of the details of the fundus as the picture is projected upon the plaque can be readily made showing both normal and abnormal conditions as to size, position, relation, etc. For instance, any foreign body lodged on the retina can be located and its size estimated; scotomata, hemorrhagic, pigmentary spots mapped out; and then the page can be torn off and filed away in the record book for future reference.

"The value of this plan of gaining data is so obvious as to need little more than mere mention, and it is of such practical value as to recommend it to all pains-taking and careful observers."

THE

OPHTHALMIC RECORD.

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THE EXAMINATION OF RAILWAY EMPLOYEES FOR VISION, COLOR-BLINDNESS AND HEARING, AND THE METHODS EMPLOYED.

Written for the Ophthalmic Record by

G. A. WALL, M.D.,
Oculist and Aurist A. T. & S. F. Hospital Association,
and C. R. I. & P. Ry.,
TOPEKA, KANSAS.

The importance which the vision, color-perception and hearing of railway employees has assumed, within the last few years, on accouut of the danger to both life and property because of the employment of men suffering from any defect of either of them, has been the reason for this paper, and is a subject which so far as I can ascertain has not heretofore been taken up. There has never yet been any standard laid down in Medical Literature for the guidance of men who may be called upon to make these examinations. It shall be my earnest endeavor to lay before you some suggestions wich you may find of value, as I have. The constant complaint of the men is that they are not treated right, and so long as no standard prevails among examiners their claims may at least cause investigation. Of course sometimes very competent workmen may meet with rejection on account of some one defect whether it be of their hearing, eyesight or color-perception, but you may answer that by saying that "no man who cannot pass the examination, as now employed for these, is competent, and that is a fact." You may say to them that anywhere near good vision or hearing will certainly pull them through, and that color blindness is rare; this gives them confidence. In 200 examinations made by me in the past year, there was rejected for bad vision 10; bad hearing 12; color blindness 3. From this you can see that no one need fear these examinations, because they are easy, but still they are thorough enough to weed out incompetent men.

There is a great deal of opposition to these examinations by the employees because they deem them not necessary, they say. The main objection to them being, if the facts were known, that by these examinations many men now employed would be found wanting, and as a consequence would be compelled to seek other employment; but if men would stop a moment and consider that these examinations are a safeguard for them, because poor vision is certainly dangerous to men around the trains, their opposition would cease. On the other hand there is no better sefeguard for the railway than these examinations, because they weed out incompetent men, and place good ones in their place, thereby lessening to the minimum the chance of accident; for no engineer is competent to guide the train with its precious burden of human freight without perfect vision to say the least.

Cases have come under my observation where men could not see distinctly the length of their engine; how would it be possible for a man like that to see objects on the track at any distance away? It would certainly be impossible for him to tell whether his track was clear or not until it would be too late to even check the speed of his train. It is not an infrequent occurrence for me to be called upon to examine some engineer because of complaints of switchman or brakeman that he could not see, which became evident by his not seeing signals, and in switching, bumping the cars together with great force, thereby endangering the life of the brakeman, who as you all are aware, stands between the cars in making his coupling, and should the draw-bar be forced in, nothing but a miracle can save him. Still the very man who makes this complaint may be himself in the same condition.

These examinations have been in use in the army and marine service for many years; but it has only been a short time since they entered into railway service. So far as I can ascertain, the first system to require them, was the Penn. Railroad which began in 1882, and since that time no one in the operating department has been employed who could not pass a satisfactory examination. The Santa Fe System began the use of these examinations in 1886, and has required them ever since of all employees in train service. All employees then in the employ of the company were exempt, but all new applicants are compelled to undergo them. The question naturally arises; what use are these examinations? This will be answered as I proceed with the reading of this paper. The last Congress passed what is known as the "Coupler Bill," its main object being to compel railroads to furnish all cars with safety couplers, for the prevention of accident to their employees. The next railroad legislation Congress should pass is a bill providing for these examinations, for the preservation of the railroad companies, the traveling public and employees themselves.

Before proceeding to the explanation of the methods employed by me I wish to give three good reasons why they should be made on all roads. (1) For the safety of employees. (2) For the safety of the company. (3) The last and greatest reason being, for the safety of the traveling public. When a person comes for examination the first thing to do is to find out his acuteness of vision, or the power which an eye, or rather its Macula Lutea, has of distinguishing form, after any anomaly of refraction, if such exist, has been first corrected by glasses. In order to measure this we must have a standard for comparison, i. e., we must find what is the size of the smallest retinal image whose form can be distinguished. This is done by measuring the angle which the object subtends at the eye. It has been found by experiment that the average size of this angle is 5′′. The test-types which are generally, I may say universally used, are those of Snellen which are composed of letters of varying sizes corresponding to the distance at which they should be seen by an emmetropic eye. The distance at which they should be seen is designated by the figures which appear immediately above the lines. From this you will see that a normal eye should see the letter E on the card before you at 200 feet, and so on down the card. But for convenience sake we take a given distance. The most generally employed distance is 20 feet, because this is about the length of the average room; we could just as well use 15 or 30 feet and obtain the same result. The distance used by me is 20 feet, and all explanations will apply to that distance. Having placed the test-types in a good light you place your patient with his back to the light and request him to read the letters, *with each eye separately;* in a few moments his visual acuteness without glasses is obtained. For instance, if E which he should see at 200 feet is only seen at 20 feet, his visual acuity $= \frac{20}{200} = \frac{1}{10}$. If he can only read the line marked 40 at 20 feet, his visual acuity $= \frac{20}{40} = \frac{1}{2}$. If he reads the line marked 20 at 20 feet, visual acuity $= \frac{20}{20} = 1$, which is normal vision. You will observe that the numerator of the fraction corresponds to the distance at which the person is placed, be this what it may, and the denominator the distance at which an emmetropic eye *should see* the letters. In recording the result we use the formula V. R. E.—: V. L. E.—: We should examine each eye separately, keeping one eye under cover of a card, and both eyes should be kept wide open because by partially closing the lids an astigmatism of considerable degree may often be overcome. Each eye should be examined separately, because with one good eye he does all his work, and sees as well as if both eyes were normal. About the only difference being that the field of vision is decreased on side of the amblyopic eye. The next question that arises is, what shall we consider sufficient vision for railway service? It has been my rule to require from firemen and engineers $\frac{20}{20}$ or normal vision in one eye, and not less than $\frac{20}{40}$ or one half normal in the other eye; or $\frac{20}{30}$ or two thirds in either eye separately. Below this standard I always reject.

In conductors, switchmen and brakemen not less than two-thirds in one eye, and half normal in the other, or $\frac{20}{40}$ or $\frac{1}{2}$ in either eye separately. This is I think higher than the other roads require, but for safety for the public, company and employee, men whcse vision falls below this, should not be employed. The next step in the examination is the determination of the field of vision. By the field of vision is meant the space within which, when one eye is closed objects can be seen by its fellow, the gaze of the latter being fixed the while on some one object or point. Thus if standing on a hill, we fix the gaze of one eye on some object on the plain below, the field of vision includes not only that object but many others also for miles around it. If the fixation object be nearer us, our field of vision will be proportionately diminished in extent. The fixation object is seen by direct vision its image being formed on the macula. The other objects are seen by eccentric vision. This is of great importance for the guiding of ourselves and avoiding objects in our way. In order to obtain the exact limits of the field the perimeter is of course indispensable, but for this work the hand suffices. The examiner places himself a few feet in front of the party asking him to fix his gaze upon the eye of the physician opposite his own (R. E. of person will be opposite left of physician), keeping the other eye closed. The physician then moves his hand inward over the field of view; the person must tell as soon as he sees the hand. By this means the physician has in his own eye the means of judging the field of view of the patient; providing the physician's field is normal they both see it at the same time. Any curtailment of the visual field is pathological and denotes some progressive disease. There are cases where central vision is good and still a serious disease may be in progress. Take for instance pigmentary degeneration of the retina; in this case central vision may be perfect while the eccentric vision may be lost entirely. This is a serious progressive disease, because with darkness cases of this kind become almost helpless, while with good light vision may be almost if not entirely normal. In retinal detachment we also have contraction of the visual field, and once this disease has begun there is no telling when sight may be lost without the least warning. So long as the macular region remains unaffected, central vision may be perfect. As to the diseases of the eye, which should cause rejection, I will include a number and give my reasons for the same. *Granular lids* should be a cause for rejection because constant exposure to wind and dust aggravates them, and sooner or later the cornea may become affected with pannus and subsequent loss of vision. Any *chronic obstruction* of the nasal duct should be a cause for rejection, because constant exposure increases the trouble, and corneal ulceration may follow, and should it come on after any accident, it will be attributed to it. Pterygium, when far advanced should bar the person's employment. After its removal, provided there is no interference with vision, the person may be employed, but should be kept under observation, for sooner or later *it may* recur. Any cases of old standing leucoma, or opacity of the cornea should cause rejection if it interferes the least with vision. A careful record should be made of such cases, because constant exposure may cause inflammatory action, and subsequent loss of the eye, and should it follow any accident, no matter how small, it will be attributed to it, and a lawsuit may ensue. Any case of anterior synechia, or when the iris is caught in a corneal cicatrix, should unhesitatingly be rejected, because no such eye is safe at all, at the same time endangering its fellow. *Posterior synechia* from an old iritis should be a cause for rejection, because constant exposure may precipitate an attack with subsequent loss of vision. *Incipient cataract* should also be a cause for rejection because in due course of time vision will become dull. All cases of *choroidal inflammation*, should be rejected no matter how good vision may be at the time, fo sooner or later, notwithstanding the best treatment, it may progress and blindness follow, thereby placing a burden on the medical department, and perhaps an accident before discovery. All cases of *myopia*, should be carefully watched, because it may become progressive and vision rapidly fail. (This refers to cases where the error was not great enough to cause rejection.) The Penn. railroad recommends and I presume follows the same recommendation of permitting men to be employed when the error of refraction is slight, and vision may be brought to a standard by wearing correcting glasses. This I think should not be permitted, because glasses are constantly becoming soiled and foggy, and then vision is interfered with materially. Any one who wears glasses is constantly bothered with the deposits of moisture which take place in cold weather. Glasses may become broken, and in this way cause danger to employee and train through poor vision of its engineer without their help. Again they should not be permitted to wear glasses because there are plenty of competent men who have good vision with the naked eye. According to rules laid down as to vision men with only one eye should under no circumstances be employed. The examination will reject men who have *squint* because vision is generally defective in one or both eyes. Any paralysis of the ocular muscles should be a cause for rejection.

The *next* step is to obtain the acuteness of hearing. This I usually do by means of the watch and voice for want of anything better. In this as in the ocular tests, we test each ear separately, keeping the tragus firmly pressed in by finger in ear not under trial. We record their acuteness of hearing in the same manner as the vision. We take a watch and get the average distance at which a certain number of normal ears, or as near normal as we can get them, can hear it and use this as a standard, e. g , let this be 24 inches: an ear that hears it at only 12 has acuteness of hearing $\frac{12}{24}$ or $\frac{1}{2}$. If he only hears when pressed on the ear we record as P—24. No one whose hearing in one ear is not at least $\frac{1}{2}$ and normal in the other, or $\frac{2}{3}$ in either ear separately should be employed. We should make an objective examination of each ear when there is any deterioration of hearing power, because there may be impacted wax and by its removal good hearing will ensue.

In all cases of chronic catarrh when the hearing is not fully up to the standard, they should be rejected, because without treatment they are certain to become much worse, and may be with the best care deafness will follow. All cases of chronic suppuration of the middle ear should be rejected, for they are always liable to mastoid complications. Any cold from constant exposure lays them liable to repeated acute attacks thereby increasing the risk of mastoid inflammation. Should it come on after some wreck, and the patient die it will be attributed to it, and a lawsuit will follow sure. Should the person have successfully passed the vision and hearing tests then we may proceed to examine his color perception. I always make this last because it saves time If they fail in the others it is useless to examine in this. The *color sense* is the power the eye has of distinguishing light of different wave lengths. According to the Young-Helmholtz theory, and this is the one most generally accepted, the retina has three sets of color perceiving elements, those for red, green, blue or violet. These are termed primary colors, all others being compounds of them. For testing the color-perception the spectrum is indispensable, but the difficulty of producing them at every moment and combining them renders it of no clinical value. The most generally, I may say universally used test, and the one employed by me, is Prof. Holmgren's, which is based on the Young-Helmholtz theory. The test-objects are Berlin worsteds of which a large number of skeins of every conceivable hue are thrown together. The worsteds are all laid out on the table in good daylight. The test-skein is taken from the pile and laid to one side, and the person is then requested to select other skeins mostly resembling this in color, and lay them by the side of the sample. It is necessary that he should clearly understand what is required of him, namely, that he should find skeins making an impression on his chromatic sense similar to that made by the sample, and independently of any name given the color. No names should be given for two reasons. First, because although the congenitally color-blind person is usually unaware of his defect, yet experience has taught him which of his sensations are called blue, red, etc., by other people, and hence he can often apply the right names to colors which he really does not see as such. Again when the color-blind person does know of his defect, he is often desirous of concealing it either because he is ashamed of it, or from interested motives. It should be explained that resemblance in every respect is not required, and that no two specimens are exactly alike. In short always begin by asking the person to pick out all darker or lighter shades of the test-skein. Should he not understand, you may then (providing you are not color-blind yourself) pick out the shades for him, and then mix them again. You need have no fear of this, for no one with defective chromatic sense will be enabled to select the proper shades any more readily for having seen some-one else arrange them a moment before. The test color with which Holmgren invariably begins his examination is a pale pure green, because green is the whitest of the spectral colors, and consequently the one in which the presence of color is the most difficult to recognize; the one most easily mistaken for grey. As we all experience the most difficulty in deciding whether there be any "color" at all present in the very deepest shades (nearly black) and the very palest shades (nearly white) it was plainly a very dark or very pale shade of green that should be employed,and Holmgren's experience made him decide for the pale shade as providing the most delicate test. The test for the diagnosis of the particular kind of color-blindness, Holmgren recommends a purple (deep pink) sample;—that is, the whole group of colors in which red and blue are combined in so nearly equal proportions that none of them sufficiently preponderate over the others, so as to give its name to the combination. Purple is of special importance for the reason that it forms a combination of two fundamental colors, red and blue, the two extreme colors which are never confounded with each other. The test is conducted as follows:—

Test 1. The pure pale green sample is laid aside and the person required to select all the other skeins which are shades of the same color as the sample. Should he place beside it as shades, other colors than green, the person is color blind. I have seen employees place all greys and light yellows beside the green as being shades of it. We can easily tell by the manner in which he proceeds whether his chromatic sense is weak or not. If he quickly selects out colors it is good. If he hesitates it is poor. This should be recorded on a blank as "good" or "hesitating." By this test we have proof as to whether he is color-blind or not, but in order to get the kind of color-defect we proceed to test 2. A pink skein is shown to the person to be examined. The trial must be continued until he has selected the greater part of the skeins of the same color, or several skeins of confusion which are generally of blue and violet, or the light or dark shades of one kind of green or grey including to blue. He who is color-blind by test 1, and he who upon test 2 selects only purple skeins is termed "incompletely color-blind." He who in test 2 selects with purple only blue and violet, or one of them is "completely red-blind." He who in test 2 selects with purple only green and grey or one of them, is completely "green-blind." The red-blind never selects the color taken by the green, or vice versa. The examination may end here, and the diagnosis be regarded as settled, but to convince railway employees, a still further trial may be made to corroborate the diagnosis.

Test 3. The red skein is presented It is necessary to have a vivid red color, like the red flag used as signals on railways. The red-blind then chooses besides the red, green and brown shades which appear to the normal sense darker than red. The green-blind selects shades which appear lighter than red. Every case of complete color-blindness as now used means *red* or *green*. All colors containing the one in which they are defective will be greyish and this in proportion to the amount of defect. The red and green blind confound these colors with each other and with grey. For this reason it is absolutely necessary that railway employees should not be color-blind, since the most important signals used on railways are red and green, and a fatal accident may occur by mistaking the color of a signal. For instance a red flag or light signifies danger and means to stop, while a white flag or light signifies safety and means to go on. How easy for a color-blind person to mistake these two signals and cause destruction to train and human life. That color-blindness is congenital and hereditary is confirmed by Wilson, and is incurable. Color-blindness may be caused by accident, as cited by Dr. Favre in many cases of railway employees who were injured, who were found to be so after some head injury. For this reason all employees, after any head injury should be examined before going back to work.

Whom should we reject? All who are totally color-blind should be rejected without comment. Those whose perception is very weak as shown by repeated trials. In conclusion I wish to say that in all cases where they seem to misunderstand what you wish, or where they seem nervous send your patient away, and tell him to come back when he feels better. This often helps him when he is not color-blind and if he is and you reject, he feels that you have treated him fairly. This last point you should remember because they so often insist that they do not know the names of colors, which is not necessary, and if you reject him he will always think it was done unfairly, and you have made an unrelenting enemy. If I have told you anything new or interesting I shall have been amply repaid for any trouble taken in the preparation of this paper.

717 Kansas Ave.

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REPORT OF CASE OF EXOPHORIA CURED BY PARTIAL TENOTOMIES AND RYTHMIC EXERCISE.

Written for the Ophthalmic Record by

C. H. PEETE, M.D., Macon, Ga.

Miss McC. æt. 22 yrs. Artist, has not been able to do a whole day's work at a time for over three years; a half hour's work caused severe pain and headache, and many times after working a few hours, has had to take to her bed. Any near work for a few minutes caused severe drawing, itching, burning sensation in top of head, sometimes being of such a degree she was compelled to resort to narcotics and ice bags to head.. Depending on her own work for support she was compelled to use her eyes a great deal.

She had been treated by prominent oculists of Knoxville, Tenn., and Atlanta, Ga., all of whom prescribed convex cylindrical lenses of greater or less strength

Her general health growing worse she was told to leave off work entirely for a few months and take to the mountains, which she did. This seemed not to benefit her so she decided to put herself under the care of a Gynecologist thinking he might find cause for these almost unbearable symptoms. Not being relieved of her head symptoms she had despaired of ever finding any relief.

On March 18, she came to my office very despondent. At this time she was wearing glasses R. & L. + 25 cyl. ax. 90 After hearing the case I immediately examined her eyes by Maddox rod test and double prisms for heterophoria, finding as a result exophoria 4° for distance and a varying from 13° to 14° for near.

I then tested the strength of the obliques. finding them well balanced. After making as thorough examination as possible without a mydriatic I noted result and appointed an hour for testing the refraction.

On the 21, I dilated the pupils. using homatropine hydrobromate eight grains to the ounce and found hypermetropic astigmatism. for which a + 50 cyl. was a little strong and a + 25 cyl. was a little weak. Then after another testing of the muscular insufficiency I told her an operation was the only thing that would give her relief. To this she readily agreed. saying she would submit to any thing to get relief. I operated on the external rectus of the left eye, doing a partial tenotomy. which reduced the exophoria to 2° for distance and 9° for near. Thinking this might be sufficient I ordered the wearing of + 50 cyl. lenses. which seemed to reduce the symptoms but not to relieve her entirely. On the 27, I operated on the external rectus of the right eye, correcting the deviation perfectly for distance and reduced it to 5° for near.

In the mean time she had attempted to work some but found the burning sensation in top of her head still present, but not so severe. Still despairing, it was with reluctance she allowed the second operation. I ordered exercise of the internal recti muscles with a lighted wax taper held at arms length and brought slowly to within a few inches of the eyes, once a day for several days. I had her visit my office each day to report results. At the end of the tenth day I found little encouragement but insisted on her using her eyes a short while every day for near work.

Being out of the city for a few days I had no report from her until April 24, when I found her doing nicely, being able to use her eyes two hours with little or no fatigue. On suggestion of Dr. Savage, I had her keep up the exercise with the taper every morning before using the eyes for near work.

On May 1, she came in feeling better than for years, and was able to use the eyes all day without any bad symptoms.

To-day she is the most grateful person I have ever seen, saying that her life had grown to be a burden, and she was beginning to feel that she did not care into what channel she drifted since she could not use her eyes to do her legitimate work.

My object in reporting this case is not to boast of the operation of partial tenotomy, but simply to show the necessity for it even in cases of so small a deviation as 4° for distance, which some claim can be corrected with lenses; also to show the importance of correcting, by operation, only the exophoria for distance, leaving the remaining exophoria in the near to be corrected by rythmical exercise, a rule practiced by Savage for several months before he published it in a late issue of his journal.

This case had been under treatment of some of our best oculists and yet this deviation was not noticed. Why should it be so, when the good that comes from the operation has been so fully and largely verified?

THE CROSSED CYLINDER.

Written for the Ophthalmic Record by
EDWARD JACKSON, A.M., M.D.,
PHILADELPHIA, PA.
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Surgeon to Wills Eye Hospital.

While this term applies strictly to any combination of cylindrical lenses with the axes perpendicular to one another, it is here intended to speak of such a combination of a convex cylinder and concave cylinder of equal strength, or their optical equivalent sphero cylindrical lens, as a convex 1 D. cylinder combined with a concave 1 D. cylinder, axes perpendicular; or its equivalent, a convex 1 D. spherical combined with a concave 2 D. cylinder; or a concave 1 D. spherical combined with a convex 2 D. cylinder.

The advantage of such a lens in the use of the trial set, was referred to at the meeting of the American Ophthalmological Society in 1887. But the hint then given has not received the attention this matter deserves. It is the lens I use most constantly and would find most inconvenience from losing, of any in my trial set; and my assistants and students have come, by working with it, to place the same estimate on its value. It can, of course, be imitated by taking a convex and a concave cylinder from the trial case, placing them with their axes perpendicular and using in the manner to be presently indicated: but a combination that is used so constantly, in every case, whether hyperopic, myopic, or astigmatic, it is much better to have constantly at hand ready for use.

When we have placed before the eye a sphero-cylindrical combination of lenses, supposed to be approximately the correction, and wish to test it by varying its strength, it is perfectly easy to alter the strength of the spherical without in any way effecting the cylindrical factor of the combination. When, however, we attempt to change the strength of the cylinder by holding before it the proper convex and concave cylinders from the trial set, we at the same time alter the general convex and concave effect of the lens. And so, without the corresponding charge in the spherical, we do not get simply a change of cylindrical effect, but a double alteration that may be very misleading.

This can best be illustrated by taking a special case. Suppose the combination hit upon to be a + 2. spherical with a + 0.50 D. cylinder, while the glass really required is a + 1.5 D. spherical ⊂ + 1. D. cylindrical. The holding of a convex 0.5 D. cylinder in front of the first combination, would be certain to make the vision worse. And although just that additional strength is needed for the cylindrical, the natural inference from such a trial would be that it was not needed. The same difficulty about fixing the strength of the cylinder will be experienced so long as the proper strength of spherical has not been exactly obtained. And each error of the kind into which the surgeon is led entails a considerable loss of time in finding out it is an error and correcting it

Of course, by using in every case both a convex and a concave cylinder and turning them each, first, to correspond with the axis of the cylinder already before the eye and then perpendicularly to it, such errors may be avoided. But besides the additional time this requires, the transition from the lens which improves the vision to the lens, which most markedly impairs it, requires a complete change of the glasses held before the eye, as well as a change of their direction, and the lost time, diminishes the force of the contrast between improvement and impairment, by which, the patient has to judge.

The use of the lens is simply, as has been indicated by the foregoing remarks, to hold in front of the approximate correction already placed before the eye and by alternately placing it so that it will first increase and then diminish the strength of the cylinder in the combination already fixed upon, to ascertain whether the cylindrical factor is of exactly the best strength.

The writer, instead of the actual crossed cylinder, has always employed the sphero-cylindrical equivalent with a concave spherical, and a convex cylindrical side. In this case, the axis of the cylinder marked on the glass corresponds with the axis of the convex cylinder that is increased by it, or is at right angles to the axis of the concave cylinder that it adds to.

The strengths found most generally useful in practice are the concave 0.50 D. spherical combined with the convex 1. D. cylindrical: the concave 0.25 D. spherical combined with the convex 0.5 D. cylindrical: and the concave 0.125 D. spherical combined with the convex 0.25 D. cylindrical. Of these three, the second is the most generally used. It is, however, best to have all of them and begin by using the strongest, unless vision equal to very nearly the full normal standard has been obtained by the combination first tried. Then, as the correction is made more and more accurate, the weaker lenses are to be employed in the same way.

Commonly, it is best to ascertain first that the strength of the spherical cannot be improved, by any change: and then to use the crossed cylinder to fix the strength of the cylinder. But where the cylindrical portion of the lens is very strong, it may be better to reverse the order. First to ascertain, by turning slightly either way, where the cylinder in front of the eye gives the best vision, and then to use the crossed cylinder to correct its strength, before doing anything with the spherical part of the combination.

This matter may seem to be one of minute detail and small importance, but I have not known any one who had carefully tried it, who would be willing to work without the aid of such a lens, or who regarded it as a matter of little importance. This is its value even where the refraction of the eye is entirely constant under the influence of the mydriatic, but if one wishes to determine the strength of cylinder required without the use of the mydriatic, the crossed cylinder—indicating whether the cylinder supposed to be the proper one should be strengthened or weakened entirely independent of the accommodation of the eye, or, at least of the regular accommodation of the eye—is quite invaluable.

* SOME HEREDITARY AND CONGENITAL EYE DISEASES.

By J. MORRISON RAY, M.D.,

Clinical Lecturer on Ophthalmology, University of Louisville.

The trend of modern pathology is to a study of the bacterial origin of disease. This has probably been carried so far that other important aids to diagnosis have been neglected. Our forefathers in medicine laid great stress upon temperament, diathesis, an idiosyncrasy in diagnosis and prognosis. Other things besides the mere presence of an organism certainly play an important part in the development as well as in the propagation of disease. This is no where better illustrated than in the ravages of tuberculosis in certain families.

Mr. Jonathan Hutchinson, in his interesting lectures on the "Pedigree of Disease," emphasizes the importance of the study of family histories and predispositions and gives a number of most interesting and graphic examples showing beyond doubt the proneness of certain forms of inflammatory disease to be transmitted.

Older writers placed such great confidence in this manner of diagnosis that Mr. Hutchinson says Prof. Laycock was, by a study of the temperament and physiognomy of his patients, enabled to make diagnoses that astonished his associates. The question of hereditry and congenital diseases must therefore at all times interest the physician.

In the study of the eye we often encounter certain congenital defects that plainly have been transmitted from parent to offspring; less frequently we see disease developing in adult life that show distinctly the results of an hereditary predisposition. But little space is given in modern text books of ophthalmology to the study of this class of diseases seemingly preferring to emphasize the inflammatory forms of disease wherein can be found some form of micro-organism on which to base the pathology and treatment. While probably diseases due to an

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* Read before Kentucky State Medical Society, Frankfort, May 1, '93.

inherited weakness are less frequent, and less amendable to treatment, they demand attention. Under existing social conditions we may have but little effect in preventing them, yet it is well that they be recognized and the possibility of their development understood.

Many varieties of eye diseases appear as the result of an hereditary transmission. Deformities of certain kinds are known by their appearance to be congenital.

I do not propose to enumerate all the possible anomalies that may occur as a result of a predisposition but to call attention to a few eye disorders that have come within my personal observation wherein this tendency was well shown.

That like begets like is no where better demonstrated than in the study of the refraction of the human eye. Hypermetropic and astigmatic parents beget hyperopic and astigmatic children; myopic parents, children with a tendency to myopia. This rule is so constant that one can often predict with certainty the condition present before an examination, the family history being known. This statement was impressed upon me by a study of the following family histories that have been under observation for six years.

In the Spring of 1888 I operated on the eyes of Mr. Y., aged seventy one years, for cataract. I operated upon the right eye first. Before operating an examination showed good light perception throughout the extent of the visual field. The operation was a success from a surgical standpoint yet when I tried to adapt lenses to compensate for the lens removed I was only able to get vision equal to $\frac{20}{200}$ with a combination as follows: + 12. Ds. ⊂ + 2. Dc. ax. 120°. The left eye was then subjected to an operation; six weeks afterward with + 11. Ds. ⊂ 1. Dc ax. 180° vision was $\frac{20}{40}$, eventually this became $\frac{20}{30}$ with spherical + 11. D. The right eye never improved. On questioning I could find no evidence of the right eye being defective before the formation of the cataract. Since that time I have examined on different occasions four of Mr. Y's children, all daughters—and they all present one amblyopic and astigmatic eye—showing the transmission of the defect that had been present in his eye before the development of the cataract. A study of the families of these daughters is also interesting. The oldest, Mrs. P., has with the right eye only $\frac{20}{100}$ vision when the best correction is made —this consists of + 2. Ds. $\supset$ + 1.75. Dc. ax. 135°. The left has with + 2. Ds. vision equal $\frac{20}{20}$. Mrs. P. has two children both of whom have a defective eye. The son has this defect, R. + 2.75 Ds. = $\frac{20}{40}$. L. + 2.75 Ds. $\supset$ 2. Dc. ax. 45°. = $\frac{20}{70}$. The daughter is amblyopic in right eye and with the best correction which is + 2.50 Dc. ax. 120° the sight is only made $\frac{20}{100}$. Mrs. J. another of Mr. Y's daughters is amblyopic and astigmatic in one eye and she has two children both of whom I have fitted with hyperopic and astigmatic lenses. A third daughter of Mr. Y. now single is amblyopic and astigmatic to a decided degree. A fourth sister I have treated for a conjunctival inflammation and she, while having defective sight in one eye, refused to wear glasses.

Myopia probably presents the strongest evidences of inheritance of any of the forms of refractive defects. Numerous examinations of the eyes of the newly born prove conclusively that children are not born myopic. The late Dr. E. T. Ely was among the first to point this out. We have however abundant evidence to show that the children of myopic parents present strong inclination to eventually develop this defect.

Among my personal observations is the family of Mrs. G.: she has a myopia of 8 D. with divergent squint and amblyopia in the left eye; her husband I have never examined yet I understand he is near-sighted. I have examined four of her children one aged nineteen a young lady, is wearing — 12 D. each eye fitted by a prominent ophthalmologist in another city; with these her vision is only $\frac{20}{100}$. Second child aged seventeen wears — 7. D. each eye adjusted by myself. Third child aged eleven has myopia 6 D. in the right eye, myopia, divergent squint and amblyopia in the left eye. The fourth child aged eight has myopia of 4 D. but does not wear glasses.

Mr. Nettleship, in an article in the Royal London Ophthalmic Hospital Reports for 1887, presents a number of cases and traces the family histories, several of them showing how amblyopia combined with refractive and other defects tends to show itself to such a decided extent as the result of inheritance.

Strabismus frequently follows from parent to child. I can recall three families in which I have operated upon two or more for convergent squint, and one in which the mother and two daughters suffer from this defect.

A friend has reported to me a family of six children five of whom have crossed eyes.

Lang and Barrett in a large number of investigations found that 29 per cent of cases of convergent squint gave a history of heredity. One remarkable instance was where for four generations two or more in each suffered from this defect.

Among the more serious eye diseases wherein heredity often becomes a most important etiological factor is cataract. Investigation sometimes in this disease often reveals a most interesting family tendency. This disposition is noticed in all forms of cataract whether infantile or senile. A few remarkable examples are found in literature. A Russian writer reports a family in which, out of forty members traced, nineteen suffered from congenital cataract.

Berry reports a family which he was able to trace through seven generations—out of fifty-nine members, twenty suffered from cataract in early life.

Thompson investigated a family through five generations—of twenty-eight, eleven were known to be affected.

Dr. John Green has reported a family in which during six generations with a total of seventy-one persons, twenty-one or 29.6% were the subject of cataract.

An interesting family showing this tendency has recently been under my observation. The family "Redmond" I encountered while examining the pupils of the "Kentucky Institution for the Education of the Blind" by favor of the Superintendent Prof. B B. Huntoon. The children found in the family all suffering probably from congenital cataract They were aged respectfully 18, 16, 14, 11, 9. The four oldest were girls, the youngest a boy. I tried to get a complete history of this family but only succeeded in finding that the father suffered in similar manner, and that he had a brother with one child also affected. The five I have reported are the only children. These have been subjected to operation by absorption with considerable improvement in all, yet like all such cases there is a congenital deficiency in the perceptive power of the retina.

The senile form of cataract less often shows such strong hereditary tendency as those just reported.

Roosa, in the American Edition of Schmidt-Rimpler, says he has operated on three in the same family for the senile variety and he knows of a family where there were five cases. I have extracted in one case recently, whose mother had submitted to a similar operation at the hands of the late Prof. S. D. Gross, when he was a resident of this State.

A study of glaucoma often shows a decided tendency to heredity. Harlen reports a case in a girl of seventeen years whose ancestry for four generations were known to suffer in a similar manner. Von Græfe was aware of this peculiarity in glaucoma. I have encountered a few instances showing this tendency. I have under observation two sisters both of whom are blind in one eye from acute inflammatory glaucoma, and the mother was said to have become blind when quite old, most probably from the same trouble. I have under treatment now a gentleman suffering from glaucoma in both eyes, one complicated by hemorrhages, whose father was blind for a number of years, by an eye disease that gave rise to frequent attacks of neuralgia. I have also encountered one case, in early life, in which there was a family history of a similar defect in others of the family.

I might continue farther in the line of congenital eye diseases, and report cases showing structural changes of different varieties, also the results of eye disease due to condition of race—for instance, the proneness of the Jewish race to glaucoma, and the colored race to so-called strumous eye disease, yet this would take me rather into a study of diathesis.

I have given these notes not so much for the purpose of putting on record the cases, but to emphasize the condition that often underlies many ophthalmic diseases, and to show that while investigating the etiology of disease, it is often advantageous to lay aside modern bacterial investigation, and search the family tendencies of the patient.

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621½ Church St., Nashville, Tenn.

DR. T. E. MURRELL,

Of Little Rock, Ark., has been elected Professor of Ophthalmology in the Barnes Medical College, St. Louis, Mo. We congratulate both the Doctor and the College. We are no prophet but we venture the prediction that this election means the addition of another well qualified Ophthalmic Surgeon to the ranks of those now engaged in practice in the "bridge city."

PROF. DR. ZEHENDER,

Of Munich, Bavaria, was in constant attendance on the meetings of the Section of Ophthalmology, at Milwaukee. His talk, in german, on the floor of the Section was listened to attentively even by ears that could not understand.

We trust soon to be able to give to the readers of the *Record* some of the thoughts of this great thinker. As an Ophthalmic Editor he easily stands among the first.

VOLUME II

Closes with this issue. The year has been a successful one to the *Record* from both a financial and literary stand-point. We have a sufficient balance in the treasury to justify the promise that volume III will be an improvement on the volume now closing. We will be able, without incurring personal expenditure, to furnish well executed cuts that may be needed for illustrating papers that may be offered us. We propose also to use heavier and better paper in the future. From a literary point of view the past gives promise for the future. Our old contributors will not forsake us, and new ones have already been added.

THE MEDICAL EDITORS ASSOCIATION,

At the meeting in Milwaukee, listened attentively to the reading of a paper on "Medic*al* Orthography" by Dr. Gould. He offered several suggestions which were approved by the Editors present. Among the recommendations made were, first, to substitute for the diphthongs *æ* and *œ* the single *e*; second, that *al* when perceded by *ic* be dropped from all words. Some awkwardness in sound will attend a compliance with the latter suggestion; for instance, we cannot be well pleased at first with the expressions "practic conclusion" and "logic deduction."

Dr. C. H. Hughes, of St. Louis, was elected president and Dr. G. M. Gould, of Philadelphia, was made secretary.

THE SECTION OF OPHTHALMOLOGY, A. M. A.,

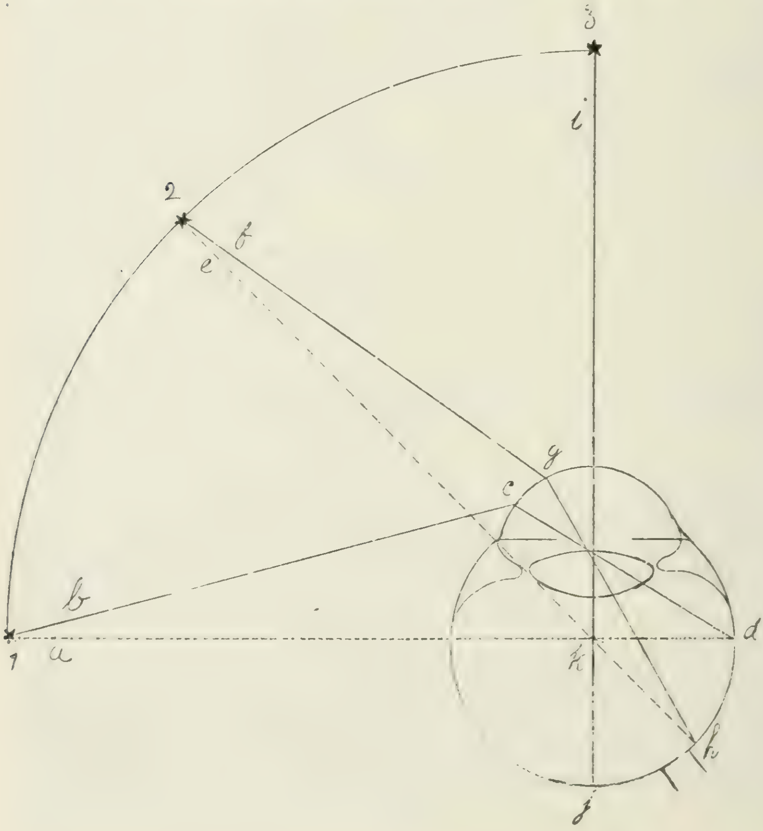
Was well attended at the Milwaukee meeting of the Association. Most of the authors of the 49 promised papers were present to read them A synopsis of each and a stenographic report of the discussions elicited, will be published in this *journal*, beginning with the next issue. Much practical good will result from the meeting.

Dr. Risley, chairman, and Dr Gradle, secretary, deserve our thanks. The newly elected officers of the Section for another year are Dr. A. R. Baker, of Cleveland, Ohio, Chairman, and Dr. L. H. Taylor, of Wilkesbarre, Pa, Secretary. These new officers will see to it that the San Francisco meeting next year will equal, if not surpass, former meetings.

A little indisposition on our part, not due to Milwaukee beer, prevented our attending the Section dinner which is one of the really enjoyable features of these meetings. We have been assured by others who were present that this second dinner was a success. The feasting and the toasting continued about two hours.

THE LAW OF PROJECTION AND THE ARTIFICIAL AND NATURAL CAUSES THAT MODIFY IT.

In the March (1893) issue of this *Journal* we announced what we believed to be the Law of Projection in the following words:— "What is true of one part of the retina, as to projection, must be true of all parts. In the field of vision that object is most distinctly seen which is on the line of the visual axis and consequently throws its image on the yellow spot. The visual axis is a line *vertical* to the yellow spot." By the aid of the



accompanying cut we propose to show that the law of projection is this: *every object seen must be on a line vertical to that part of the retina receiving the impress of the light, regardless of the direction of the axial ray in the eye.* In the cut the star-shaped figures 1, 2 and 3 represent sources of light. The eye is represented as being fixed on fig. 3 from which extends the line *i* through the eye to the macula lutea. This line represents the coinciding visual axis and the central ray of the cone of light and is conceded to be vertical to the retina at this point. While the vision is fixed on fig. 3, fig. 1, which is 90° from fig. 3, makes its impress on the nasal side of the retina 90° from the macula. That fig. 1 may be seen at all it must send rays of light through the cornea and pupil into the eye. The incident ray is *b c* while *c d* is the ray refracted (for convenience of study the combined refraction of the cornea and the lens may be represented as taking place at the corneal surface). Its impress is made on the retina at *d*. In obedience to the law the source of the light is projected on the line *a d* which is vertical to the retina at *d*. In the same manner, as is shown in the cut, fig. 2 to be seen must send light through the cornea and pupil into the eye, that it may make its impress on the retina. The incident ray is *f g* and the refracted ray *g h*. The source of the light is at once projected on the line *e h* which is vertical to the point of the retina at *h*. As is shown in the cut the three lines of direction (projection) cross one another in the center of retinal curvature and are therefore radii prolonged.

In the perfect eye all that we claim for the macula lutea, as to projection, must be granted. This being granted it can be easily made clear that all points of the retina obey the same law of projection. The arc *1-3*, on which are located the three sources of light, and the retinal arc *j d*, on which the images of these objects fall, are each 90° and parts of concentric circles, the common center being at *k*. Since objects are seen on straight lines and fig. 1 is at a right angle to fig. 3, its image on the retina at *d* must be just 90° from *j*, the macula, where falls the image of fig. 3. Thus we can understand how objects situated on any part of the arc *1-3* must throw their images on corresponding points of the retinal arc *j d*. If further confirmation were needed we have it in the fact that, when the eye sees two lights, represented in the cut by fig 3 and fig. 1, if the visual axis is made to sweep the arc from 3 to fix on 1, while the attention is fixed on fig. 3, the latter is not seen to move, thus showing that every part of the retinal arc (from *j* to point of retina cut by lind *a d*) over which the image of fig. 3 has passed obeys the same law of projection as that governing the macula.

From the above reasoning we deduce the following conclusions:—the line of direction is a prolonged radius of retinal curvature; the center of direction is the center of retinal curvature, *k*; the visual angle is located at *k* and is unalterable in position but may be changed in size by properly centered convex and concave lenses; the visual angle being nearer the retina than formerly supposed, retinal images must be correspondingly smaller; on either side of the visual axis, the incident and refracted ray, with the line of direction as a base, form a triangle the apex looking towards the visual axis, the angle at the apex growing larger as the source of the light approaches the visual axis.

That the law of projection is susceptible of modification by conditions that may be brought into existence artificially and by at least two natural conditions cannot be denied. Other laws of nature are subject to similar modifications. In obedience to the law of gravitation everything within the range of the influence of the earth is drawn towards its center. If other forces could not modify the law of gravitation, all objects on the earth would be fixed, and any object in the atmosphere would be drawn toward the earth in a straight line. If a ball be allowed to drop from the hand it goes in a straight line to the earth: if it be thrown by the exercise of the muscular power of the arm, it must come to the earth but in doing so it describes a curve. The muscular force has thus modified the law of gravitation.

The modifications of the law of projection take place only when there are *two* eyes. With a lighted candle 20 feet distant, one eye may be closed while the other is fixed on the blaze. Interposing a prism of 6°, base out, before the open eye the candle is displaced toward the opposite side, where it can be readily fixed by a contraction of the internal rectus shifting the visual axis; but the line of projection remains vertical so long as the fellow eye remains closed. On opening the other eye two candles are seen, but they immediately run into each other in obedience to the law governing the recti muscles causing them to so act as to place the macula in each so that it may receive the image of the candle. In this case the line of projection of the eye before which the prism is held does not pass through the center of direction, *k*, but toward the temporal side of it. Remove the prism and at once the law of projection re asserts itself. The sensorium is so influenced by the disturbing element (the prism) that at one trial both lights seem to move toward each other, at another trial the true candle appears to move to the false and again the false to the true candle. It is, at the same time, evident that the line of projection is displaced only in the eye before which the prism is held. By reversing the prism the line of direction can be made to pass on the nasal side of the center of direction, *k*.

In a similar way it can be shown that cylinders placed before non-astigmatic eyes obliquely in opposite directions, or, if in same direction, more obliquely before one eye than the other, cause a modification of the law of projection In the case of prisms the modification of the law of projection is effected by the contraction of the recti in fusing the images; in the case of the cylinders the contraction of the obliques for the purpose of fusing the images causes the modification of the law of projection.

Prisms and cylinders constitute the two *artificial means* that disturb the law of projection. Decentration of the macula in, out, up or down but in opposite directions in the two eyes, or if in the same direction, the one being decentered more than the other; and oblique astigmatism, the obliquity being in opposite directions, or if in the same direction, more oblique in the one eye than in the other, constitute the two *natural means* that disturb the law of projection.

Any condition disturbing the law of projection is an undesirable thing and should be remedied. In cases where there is decentration of the maculæ the law of projection can be given full play only by means of correct prisms properly placed; likewise in oblique astigmatism the majesty of the law can be asserted only through the means of correcting cylinders properly placed. In determining both of these conditions the ophthalmometer is invaluable.

Have we not in this an explanation why, in some cases of heterophoria, prisms are a source of much comfort, while, in other cases, they add to the discomfort? In the light of the reasoning had it seems clear that when the maculæ are properly centered, whatever form of heterophoria may exist, be it of high or low degree, it would not be wise to attempt its relief by means of prisms. Prisms should be prescribed for that form of heterophoria only where there is evidence of decentration of the maculæ.

Lastly, the Law of Projection as herein announced settles the question of corresponding parts of the two retinæ. If the two visual axes be fixed on an object, it can be demonstrated that another object on the horopter, to the right, will throw an image on the nasal half of the right retina the same distance from the macula as the image in the left eye will be from the macula, on the temporal half of that retina. In each case the object will be projected on lines vertical to the parts of the two retina receiving the impress. These lines of projection intersecting at the object, make it appear as *one*. The same can be demonstrated as true of any object situated on the horopter.

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DISEASE OF THE MASTOID; FIRST IN ONE EAR AND AFTER TYELVE YEARS IN THE OTHER.*

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In Sept. 1878, I was called to see Mrs.——, who was suffering from a painful affection of her left ear. The pain appeared to be deep-seated, and to involve the post-auricular region as well as the side of the head. She had never complained of any trouble in her ears before. The pain was so severe as to interfere with sleep; and the hearing became somewhat impaired. No discharge from the ear was present, and on examination the drum membrane was but slightly affected. There was but little to indicate serious disease of the ear, except the severe pain. Leeching was employed behind the ear, hot fomentations, and opiates at night as the pain was more severe then. These agencies did not afford any permanent relief; and after ten days, as the mastoid was tender on percussion, I practised Wilde's incision, carrying the knife freely through the periosteum and even into the superficial layers of bone. The pain was very materially reduced; but there was not entire relief, and an opiate was occasionally demanded. After about four weeks from the onset recovery ensued. Throughout, the drum membrane showed scarcely any change, and remained intact. The hearing became as good as ever, without any special treatment, and has remained so since.

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* Read at a meeting of the Maritime Medical Association of Canada.

In the latter part of Dec. 1890 she began to suffer with the right or opposite ear. She now lived at some distance from me, but she was under the care of Dr. McDonald one of our best and most experienced physicians. The disease began in the same way as in the left ear, with severe pain; but without any discharge from the ear at any time. After some time I received a note from her physician respecting her disease. I advised what I thought best, but stated that I feared the mastoid was affected. He urged her to come and see me: but, dreading the journey, she put it off and was finally seen by a physician who treats diseases of the ear. He punctured the soft parts over the mastoid and let out some pus. This afforded a certain amount of relief: but deep-seated pain, radiating over the side of the head, persisted; and was constant for three months or more afterwards. The opening made continued to discharge more or less pus. During the latter part of June she came to the city and consulted me. I found the drum membrane intact, but some swelling at the posterior and superior part of the canal at the junction of the osseous and cartilaginous parts. Hearing was somewhat impaired, and constant pain of a most distressing kind over the mastoid and side of the head running up to the vertex. She described the feeling as if it was a weight. Upon introducing a probe into the sinus behind the ear, I detected bare bone. Mastoid tender, I informed her that there was doubtless pus imprisoned in the bone, and that an opening was required to let it out. Next day with the assistance of Dr. Lindsay, I proceeded to open up the mastoid cells; after she had been brought fully under the influence of ether, I utilized the sinus already existing, and made a vertical incision through it. After exposing the bone fully, I examined to see if any continuation of the sinus extended into the bone where it was denuded of the periosteum, but I was unable to find any. With gouge and mallet I chipped away the bone in the direction of the cells. The bone itself was quite dense. I then used a small drill to reach the air spaces, after I had proceeded about half an inch inwards and forwards, with the gouge. But not until I had broken up more or less of the septa between adjoining cells with a probe, did I succeed in liberating the pus. I was surprised to find the outer table of bone overlying the passage made into the air cells was distinctly movable upon pressure with the probe. I did not disturb it as there was no evidence of necrotic tissue, and the periosteum was firmly adherent. After syringing out the cavity made, with bichloride of mercury solution, and introducing a rubber drainage tube, the wound was dusted over with iodoform and carefully dressed. After recovery from the anesthetic, she felt decidedly better and slept well that night. Next day on syringing out the wound, some of the liquid came out of the posterior part of the auditory canal. The drum membrane was intact, as proved by inflation with Politzer's bag and by inspection. Hearing for a whisper 15″. The wound was dressed daily; and as she was now altogether free of pain, I advised her, a week after the operation, to go home and remain under the care of her physician. The wound was cleansed daily with the peroxide of hydrogen diluted, and a lotion of diluted hydrochloric acid, pepsin and water was injected into the cavity to aid in the removal of the necrotic tissue in the pneumatic spaces, iodoform emulsion was used as a final dressing for the cavity. After a time her physician was unable to get the rubber tube in as easily as at first, and he substituted a piece of silver wire twisted upon itself. During the progress of the case communication with the tympanic cavity became re-established and the hydrogen peroxide when injected into the wound passed out by the eustachian tube through the mouth and nostrils. In the course of a few months the healing was complete. I saw her after a year or more, and found the hearing for a whisper acute at 20″ and for my watch at 14″.

As Buck very properly observes, "no two cases of mastoid disease are exactly alike, yet it is not difficult to arrange them in a few groups." They have one feature that is almost invariable, viz., in acute cases the disease co-exists in the two parts of the middle ear; while in those which are chronic, an interval of longer or shorter duration occurs, after the tympanic cavity has been attacked before the inflammation involves the cells of the mastoid. Sometimes the disease has become quiescent in the drum cavity before it involves the mastoid.

In the foregoing case the drum cavity escaped with but little if any change, and the inflammation was centred in the pneumatic spaces of the mastoid. In the transactions of the American Otological Society for 1881 Dr. Knapp reports a case which was very similar to the first attack which my patient had. It was called by him "acute mastoiditis interna," and was brought on by the use of the nasal douche. The tympanum was intact. No pus in the drum cavity. After some time he opened the mastoid into the cavity of the antrum, but found no pus, only serous fluid. The lining membrane of the cavities was very vascular, and a number of polypoid excrescences existed in the antrum. The patient completely recovered.

With regard to the recent attack in the R. ear, the disease went on to the formation of pus both on the surface beneath the periosteum and in the cells Gruber says, "a primary periostitis in this region is of very rare occurrence. When it does occur it is usually from traumatic causes, rarely from cold, and the process is not generally confined to the periosteum, but affects all the soft tissues of the region. Secondary periostitis on the other hand is of frequent occurrence in connection with inflammatory processes of the aural structures." He further says, "an inflammation established in the lining membrane of the mastoid cells may extend itself without further implication of the bone by way of the squamo-mastoid fissure; or by the interstices left after incomplete closure, or again by accidental fissure." Buck says, "a periostitis of the mastoid process is always, I believe, to be intrepreted as the result of direct violence (a blow or a fall) or as an extension of an inflammation located either in the external auditory canal or in the mastoid cells." From the mucous membrane lining the antrum numerous emissary veins pierce the bone, and along these, inflammation of the cells is often extended to the surface of the bone.

Mr. Dalby, in the Medico-Chirurgical Transactions, states that the mastcid cells sometimes become primarily inflammed, while thoroughout the course of the disease the tympanum remains healthy. In the N. Y. Med. Record June 4, 1881, Dr. Gruening reports a case *in which there was no disease of the ear*, thereby meaning the typanic cavity. He drilled the bone and found pus. In Knapp's Archieves of Otology which are a perfect storehouse of information on mastoid disease extending over twenty years, I find three cases reported in the 8th volume occurring in the practice of the late Dr. Agnew. These were regarded as cases of primary disease of the mastoid cells. The drum membrane was intact, and pus issued from the posterior wall of the auditory canal, in which a sinus was discovered. Persistent pain existed over the mastoid and tenderness. Relieved by Wilde's incision. In vol. 9 of these Archieves, Hotz of Chicago, in reporting a case of primary post-aural abscess of a subperiosteal origin, doubts the accuracy of the diagnosis of these cases as primary inflammation of the mastoid without demonstrable inflammation of the middle ear and with a fistulous condition between the mastoid cells and the external auditory canal; because the probe failed to prove the communication. But in my patient there was no doubt of the disease in the cells of the mastoid, and also of the passage into the auditory from the latter, although I did not suspect its existence before the operation.

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